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# TOBACCO BASICS HANDBOOK

THIRD EDITION



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# TOBACCO BASICS HANDBOOK

THIRD EDITION

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## INTRODUCTION

### The Tobacco Basics Handbook

The Tobacco Basics Handbook is designed to provide a comprehensive evidence-based source of information to assist a variety of readers. This handbook extensively documents survey results and findings from many studies and sources, combining these into a single source of basic facts and current knowledge in the tobacco control field.

#### More than a reference

The Tobacco Basics Handbook is intended primarily for people working within tobacco reduction, but its content is accessible to anyone interested in this important area of population health. The handbook provides clear, readable information in sections that can be used independently. Because the chapters are designed to be used independently, you will see information repeated in some sections.

In the handbook, you will find information that is

- **Alberta specific**

Where possible, this handbook uses Alberta data and puts the issues in a context relevant to people in this province. In addition, Canadian and world statistics are provided.

- **evidence-based and fully referenced**

Most information in the handbook is based on articles from peer-reviewed journals. Every effort has been made to check the accuracy of the information and to ensure that a substantial body of evidence supports the information reported.

- **up to date**

Research in this field changes every day. This handbook is based on current, published research, and will be revised from time to time as necessary. For annual updates on statistics such as smoking prevalence, refer to the Canadian Tobacco Use Monitoring Survey.

## Alberta

### In 2006,

- 21% of Albertans aged 15 years and older were current smokers (16% were daily smokers and 5% were occasional smokers).<sup>1</sup>
- Daily smokers in Alberta smoked an average of 15.9 cigarettes per day.<sup>1</sup>
- 26% of Albertans were former smokers and 53% were never smokers.<sup>1</sup>
- 23% of Albertan males were current smokers.<sup>1</sup>
- 19% of Albertan females were current smokers.<sup>1</sup>
- 15% of Alberta youth aged 15 to 19 were current smokers (15%<sup>†</sup> were males and 16%<sup>†</sup> were females).<sup>1</sup>
- A greater proportion of never smokers (33%) than current smokers (16%) completed university.<sup>1</sup>

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

## DEFINITIONS FOR FINDINGS FROM THE CANADIAN TOBACCO USE MONITORING SURVEY

*Smoking prevalence* is the proportion of a population that smokes cigarettes at a given time.

### Smoking Status

A *current smoker* is a person who currently smokes cigarettes daily or occasionally.

A *daily smoker* is a person who currently smokes cigarettes every day.

A *non-daily (occasional) smoker* is a person who currently smokes cigarettes, but not every day.

A *non-smoker* is a person who currently does not smoke cigarettes.

### Smoking History

A *former smoker* is a person who has smoked at least 100 cigarettes in their life, but currently does not smoke.

An *experimental smoker* is a person who has smoked at least one cigarette, but less than 100 cigarettes, and currently does not smoke cigarettes.

A *lifetime abstainer* is a person who has never smoked cigarettes at all.

An *ever smoker* is a person who is a current smoker or a former smoker.

A *never smoker* is a person who was an experimental smoker or who is a lifetime abstainer.



## SMOKING PREVALENCE

Using data obtained from the World Health Organization (WHO), Corrao et al. (2000) estimated that 30% of the global population were current smokers; specifically, 48% of males and 12% of females smoked worldwide. The American Cancer Society (2006) reported that there was a substantially higher prevalence of smoking among males in developing countries than in developed countries (50% vs. 35%, respectively). The reverse was found to be true for females; there were more female smokers in developed countries than female smokers in developing countries (22% vs. 9%, respectively).

Worldwide, nearly five million deaths a year are due to tobacco use, which accounts for roughly 12% of global adult mortality.<sup>5</sup> It is estimated that this number will more than double by 2020, and that 70% of tobacco-related deaths will occur in developing nations.<sup>5</sup>

Smoking rates began declining in Canada and the western world when the health consequences of smoking were made public in the 1960s with reports such as the United States surgeon general's report on smoking and health.

The majority of Canadians do not smoke. In 2006, 81% of Canadians aged 15 years and older did not smoke (80% of males and 83% of females).<sup>1</sup> In 2005, in both Canada and Alberta, there were more people who had quit smoking than people who currently smoked.<sup>1</sup> Not only are fewer Canadians smoking, they are smoking less. In 1999, daily smokers consumed an average of 17 cigarettes per day. In 2002, this number had decreased to 16.4 cigarettes per day, and in 2006, daily smokers consumed 15.5 cigarettes per day.<sup>1</sup> Despite these encouraging numbers, there is still a large number of Canadians and Albertans who smoke; 19% of Canadians and 21% of Albertans were current smokers in 2006.<sup>1</sup>

### Smoking in Canada and Alberta

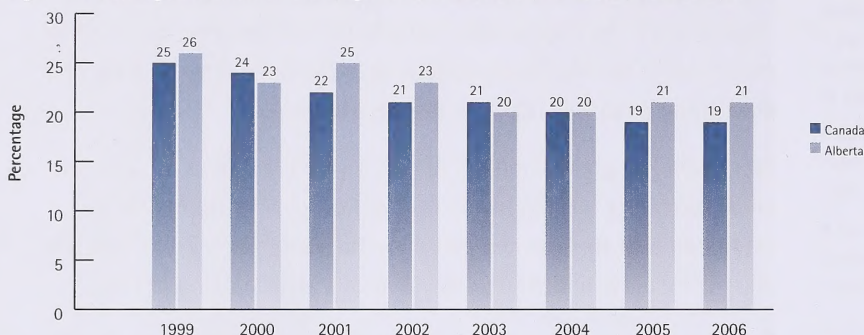
The Canadian Tobacco Use Monitoring Survey (CTUMS) asks Canadians aged 15 years and older about tobacco use and related issues. It has provided reliable data on the population's smoking patterns and behaviour since 1999. Thus, it is used as the primary source to report on tobacco use nationally and provincially for those aged 15 years and older.

## Canada

### ***Smoking prevalence in Canada declined 6% between 1999 and 2006.***

In 1999, 25% of Canadians aged 15 years and older were smokers;<sup>7</sup> this decreased to 19% in 2006.<sup>1</sup> In 2006, 14% of Canadians smoked daily and 4% smoked occasionally, and those who smoked daily consumed an average of 15.5 cigarettes per day. Further, 27% of Canadians were former smokers and 54% were never smokers.<sup>1</sup>

Figure 1. Percentage of Current Smokers, age 15+ years, Canada and Alberta, 1999 to 2006



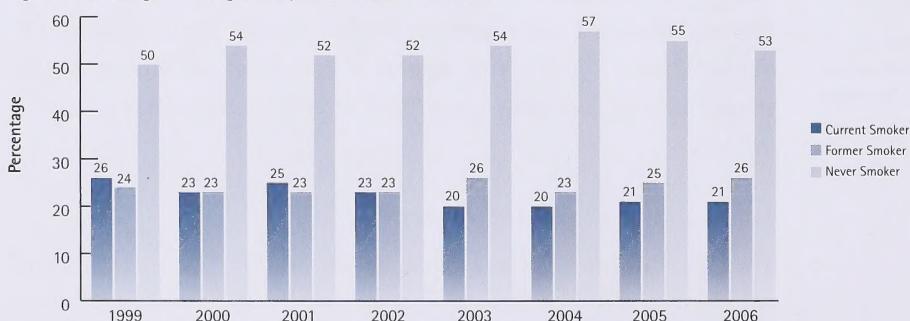
Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>

## Alberta

### ***Smoking prevalence in Alberta declined 5% between 1999 and 2006.***

Figure 2 illustrates the smoking status (current, former, or never smokers) of Albertans between 1999 and 2006. In 1999, 26% of Albertans aged 15 years and older were smokers;<sup>7</sup> this decreased to 21% in 2006.<sup>1</sup> In 2006, 17% of Albertans smoked daily and 5% smoked occasionally, and those who smoked daily consumed an average of 15.9 cigarettes per day. Further, 26% of Albertans were former smokers and 53% were never smokers.<sup>1</sup>

Figure 2. Smoking status, age 15+ years, Alberta, 1999 to 2006



Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>



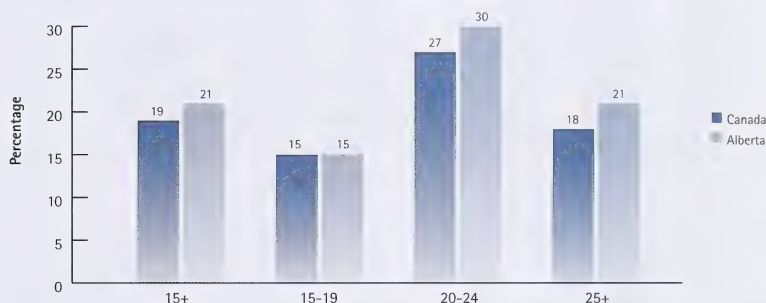
## Smoking and Age

**National and provincial smoking rates are highest among 20- to 24-year-olds.**

### Canada

In 2006, 27% of Canadians aged 20 to 24 years were current smokers; this rate was higher than the rate for those aged 15 to 19 years and those 25 years and older (see Figure 3).<sup>1</sup> Canadians aged 20 to 24 also had the highest rate of daily smokers (18%).<sup>1</sup> In contrast, adults aged 55 years and older had the lowest rate of current smokers (11%).<sup>1</sup> Among youth aged 15 to 19 years, 15% were current smokers, and 9% were daily smokers.<sup>1</sup>

Figure 3. Current smokers, by age group, Canada and Alberta, 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>1</sup>

### Alberta

In 2006, 30% of Albertans aged 20 to 24 years were current smokers; this rate was higher than the rate for those aged 15 to 19 years and those 25 years and older.<sup>1</sup> In fact, the percentage of current smokers aged 20 to 24 in Alberta increased between 2005 and 2006 from 27% to 30%. The highest rate of daily smokers was found among Albertans aged 35 to 44 years (22%), followed closely by those aged 20 to 24 years (20%).<sup>1</sup> Among youth aged 15 to 19 years, 15% were current smokers and 9% were daily smokers.<sup>1</sup>

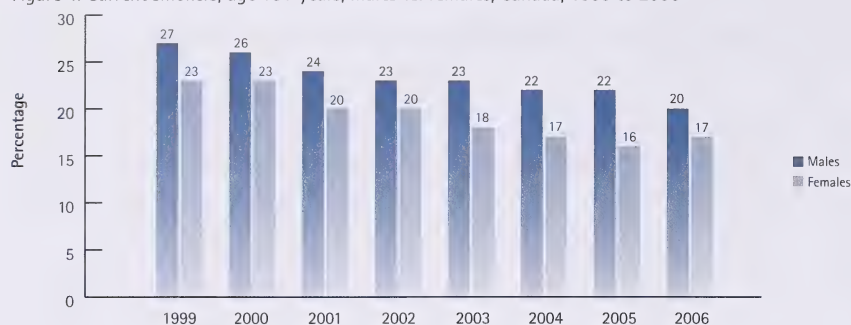
## Smoking and Gender

**Nationally and provincially, there are more males than females who smoke.**

### Canada

Among Canadians aged 15 years and older, 20% of males and 17% of females were current smokers in 2006.<sup>1</sup> This was a decrease from 1999, when 27% of males smoked and 23% of females smoked (see Figure 4).<sup>1</sup>

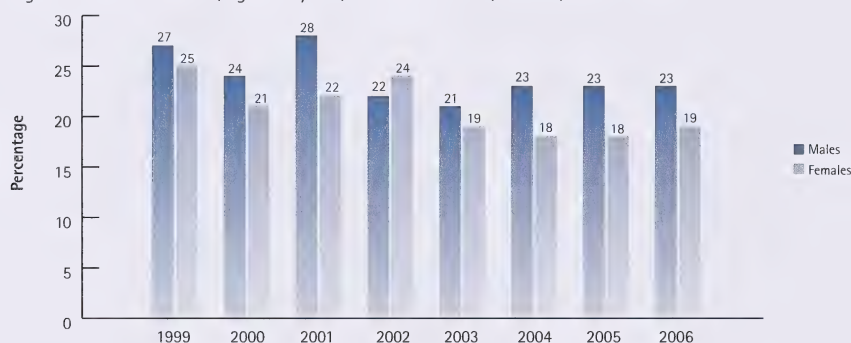
Figure 4. Current smokers, age 15+ years, males vs. females, Canada, 1999 to 2006

Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>

## Alberta

In Alberta, males have higher smoking rates than females. Among those aged 15 years or older, 23% of males and 19% of females were current smokers in 2006 (see Figure 5).<sup>1</sup> Like national smoking rates, Alberta's 2006 smoking rates were lower than they were in 1999 (in that year, 27% of Alberta males and 25% of females smoked).<sup>1</sup>

Figure 5. Current smokers, age 15+ years, males vs. females, Alberta, 1999 to 2006

Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>

## Smoking, Age, and Gender

***National and provincial smoking rates are highest among young adult males.***

### Canada

As shown in Figure 6, young Canadian males and females aged 15 to 19 had smoking rates of 16% and 14% respectively in 2006.<sup>1</sup> Males aged 20 to 24 had higher smoking rates than females of the same age (31% vs. 24% respectively), and the same trend was found for males and females who were 25 years of age or older (20% vs. 17%, respectively).<sup>1</sup>

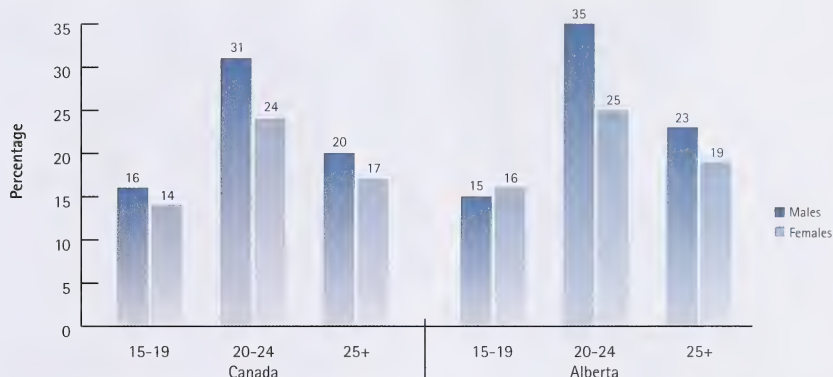
<sup>1</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.



## Alberta

As indicated in Figure 6, male and female youth aged 15 to 19 had similar smoking rates whereas male young adults between the ages of 20 and 24 had higher smoking rates than their female counterparts. Among adults aged 25 years and older, males had higher smoking rates than females (23% vs. 19%, respectively).<sup>1</sup>

Figure 6. Current smokers, age 15+ years, males vs. females, Alberta, 1999 to 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>1</sup>

## Youth

### DEFINITIONS FOR THE YOUTH SMOKING SURVEY

An *experimental smoker* is a person who has smoked between 1 and 99 cigarettes in their lifetime, and has smoked in the 30 days preceding the survey.

A *puffer* is a person who has smoked less than one whole cigarette in their lifetime, but has tried smoking.

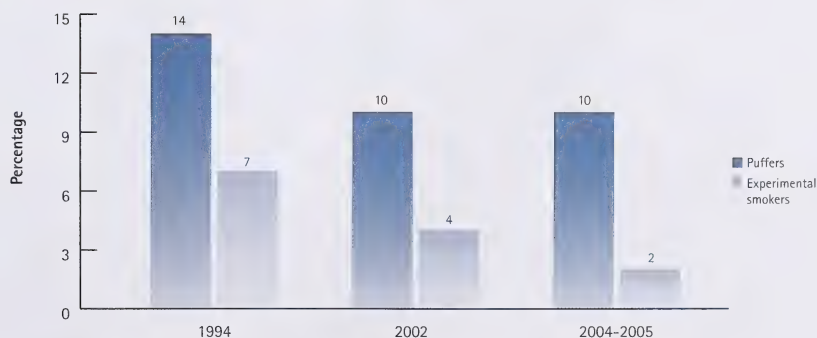
Both the Youth Smoking Survey (YSS) and CTUMS results are used in the following section. The YSS asks youth in grades 5 to 9 across Canada about their tobacco use and related issues.

## Canada

### Grades 5 to 9

In 2004/2005, 2% of Canadian youth in grades 5 to 9 were experimental smokers and 10% were puffers.<sup>9</sup> The proportion of experimenters and puffers decreased between 1994 and 2004/2005 (see Figure 7).

Figure 7. Experimental smokers and puffers, grades 5 to 9, Canada, 1994, 2002, 2004-2005

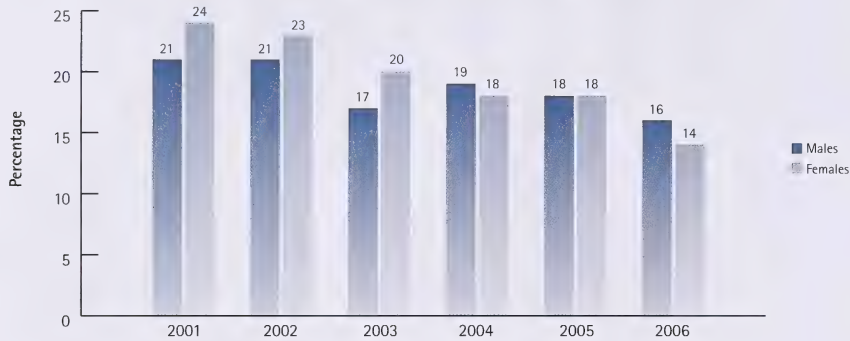


Source: Canadian Tobacco Use Monitoring Survey (1999-2006)<sup>1</sup>

### Ages 15 to 19

As shown in Figure 8, 15% of Canadian youth aged 15 to 19 were current smokers (16% of males and 14% of females, respectively) in 2006.<sup>1</sup> Youth smoking rates decreased from 2001, when 22% of youth aged 15 to 19 were current smokers (21% of males and 24% of females).

Figure 8. Current smokers, aged 15–19, males vs. females, Canada, 2001 to 2006



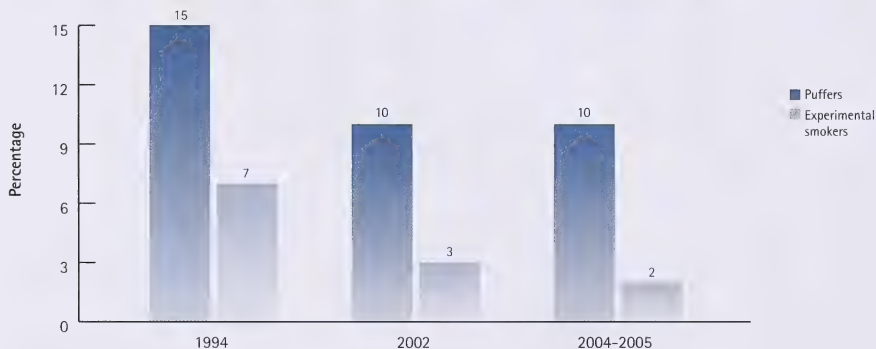
Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>

### Alberta

#### Grades 5 to 9

In 2004/2005, 2% of Albertan youth in grades 5 to 9 were experimental smokers, and 10% were puffers.<sup>9</sup> The proportion of experimenters and puffers decreased between 1994 and 2004/2005 (see Figure 9).

Figure 9. Experimental smokers and puffers, grades 5 to 9, Alberta, 1994, 2002, 2004–2005

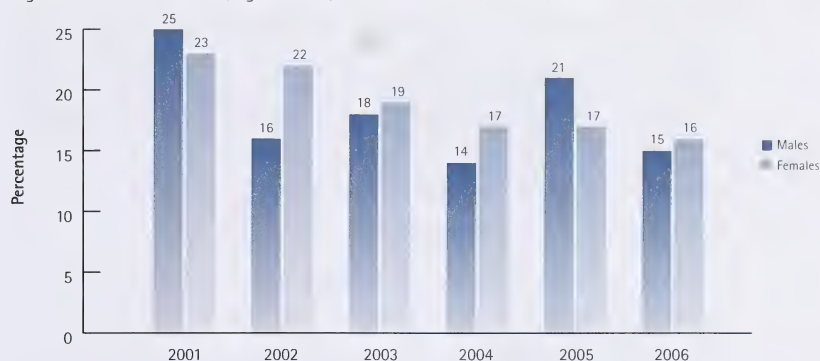


Source: Canadian Tobacco Use Monitoring Survey (1994, 2002, 2004–2005)<sup>1</sup>

### Ages 15 to 19

In 2006, 15% of Albertan youth aged 15 to 19 were current smokers (15%<sup>†</sup> of males and 16%<sup>†</sup> of females).<sup>1</sup> As shown in Figure 10, youth smoking rates have decreased from 2001, when 24% of Albertan youth aged 15 to 19 were current smokers (25% of males and 23% of females).

Figure 10. Current smokers, aged 15–19, males vs. females, Alberta, 2001 to 2006



Source: Canadian Tobacco Use Monitoring Survey (1999–2006)<sup>1</sup>

(Refer to the “Youth and Smoking” chapter for more information.)

## Smoking, Education, and Employment

***In Canada and Alberta, a greater proportion of never smokers than current smokers completed university.***

### Canada

According to CTUMS 2006, 32% of never smokers reported that the highest level of education they attained was university, whereas only 15% of current smokers had done so.<sup>1</sup>

Of Canadian employees, 21% smoked, 25% were former smokers and 54% were never smokers.<sup>1</sup> Employees in the occupational area of trades, transport and equipment operation had the highest proportion of current smokers (31%) followed by employees in primary industries (30%).

### Alberta

In terms of education and smoking status, the 2006 CTUMS provincial results are similar to those found nationally: 33% of never smokers and 16% of current smokers reported that university was the highest level of education they attained.<sup>1</sup>

In 2006, the percentage of Albertan employees who smoked (23%) was slightly higher than the national average (21%). Among employees in Alberta, 24% were former smokers and 54% were never smokers.<sup>1</sup> In the occupational area of trades, transport and equipment operation, 34% of employees were current smokers (estimates were not reliable enough to report the percentage of current smokers in the primary industry).<sup>1</sup>



A 2002 AADAC study examined information on substance use (including tobacco use) in the Alberta workplace. Study results revealed that

- 30% of workers in the paid labour force had used tobacco (that is, cigarettes, cigars or smokeless tobacco) at some time in the month prior to the survey
- cigarettes were the most commonly used type of tobacco product
- one-quarter of Alberta workers (27%) were daily smokers
- one in 10 workers (13%) reported moderate (11 to 19 cigarettes per day) or heavy (20 or more cigarettes per day) smoking
- less than one-quarter (22%) of workers (for an estimated total of 368,236 people) used tobacco while at work

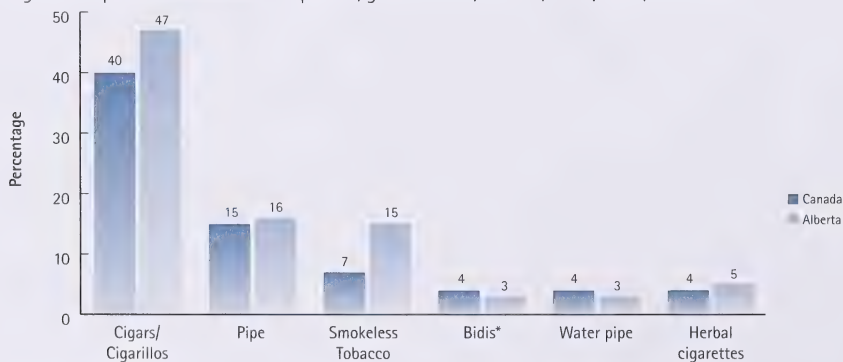
## Smoking and Culture

Aboriginal people have higher smoking rates than the rest of the Canadian population. In 2002/2003, 59% of the First Nations population smoked,<sup>3</sup> and in 1999, 72% of the Inuit population smoked.<sup>2</sup> Both of these rates were triple the rate found in the Canadian population as a whole. The mean age of smoking initiation among First Nations people was 16 years of age.<sup>3</sup> The 1999 study showed that among Inuit who smoked, 60% started before the age of 16.<sup>2</sup> The author of the study suggests these high smoking rates may be explained in part by “a strong cultural identification with tobacco, a reluctance to view it as harmful to health and an association to social and economic health determinants” (p. 108).<sup>2</sup>

## Rates for Other Tobacco Products

Cigarettes are the most common tobacco product consumed across the world.<sup>5</sup> However, there are many other forms of tobacco that are used globally, nationally and provincially. These include cigars and cigarillos, pipes, smokeless tobacco (spit tobacco), and bidis (small, hand-rolled cigarettes). Figure 11 illustrates the national and provincial rates of experimentation with these products.

Figure 9. Experimental smokers and puffers, grades 5 to 9, Alberta, 1994, 2002, 2004-2005



Source: Canadian Tobacco Use Monitoring Survey (1994, 2002, 2004-2005) \*Bidis information is from 2004.

## Cigars and cigarillos

Beginning in the mid-1980s, the cigar industry intensified its public relations efforts in the United States through strategies such as cigar dinners, product placement, feature stories, sporting events and the development of cigar-friendly lifestyle magazines, such as *Cigar Aficionado*. Between 1993 and 1998, U.S. prevalence increased by about 50%. Cigar smoking has risen in Canada as well.<sup>1</sup>

### Canada

In 2006, 4% of Canadians reported smoking a cigar or cigarillo in the month before the survey<sup>1</sup> (up from 3% in 2003). As illustrated in Figure 11, with regard to experimentation, 40% of Canadians reported having tried a cigar or cigarillo<sup>1</sup> (up from 34% in 2003).<sup>13</sup>

### Alberta

In 2006, the rate of cigar and cigarillo use in Alberta was higher than the national rate: 6% of Albertans reported smoking a cigar or cigarillo in the month before the survey<sup>1</sup> (up from 4%<sup>†</sup> in 2003).<sup>13</sup> Forty-seven per cent of Albertans reported having tried a cigar or cigarillo<sup>1</sup> (up from 39% in 2003).<sup>13</sup>

## Pipes

Pipe smoking was the initial form of tobacco consumption introduced in the sixteenth century. It was largely replaced by snuff and cigars in the seventeenth century, and then by cigarettes in the nineteenth century. However, many people still use pipes to smoke tobacco.

### Canada

Pipe use is less prevalent than cigar use. The 2006 CTUMS found that less than 1%<sup>†</sup> of Canadians reported smoking a pipe in the month before the survey, and 15% of Canadians reported having tried smoking a pipe in 2006.

### Alberta

Pipe use in Alberta is also less prevalent than cigar use, which is consistent with national findings. Less than 1%<sup>†</sup> of Albertans reported smoking a pipe in the month before CTUMS, and 16% of Albertans tried smoking a pipe in 2006.

## Smokeless tobacco

Smokeless tobacco refers to tobacco that is consumed without combustion. It is generally placed in contact with mucous membranes in the mouth or nose, and is found in two basic forms: snuff (dry, moist, or in sachets) and chewing tobacco (loose leaf, plug, and twist).

(Refer to the “Smokeless Tobacco” chapter for more information.)

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

## Canada

According to the 2006 CTUMS, approximately 1%<sup>†</sup> of Canadians used smokeless tobacco in the month before the survey, and 8% reported having tried smokeless tobacco.

## Alberta

Approximately 2%<sup>†</sup> of Albertans used smokeless tobacco in the month before the survey. Smokeless tobacco experimentation rates in Alberta were more than double those found in the Canadian population as a whole; 15% of Albertans reported having tried smokeless tobacco. The only province with higher smokeless tobacco experimentation rates than Alberta is Saskatchewan (20%).<sup>1</sup>

## Male youth in Canada, Alberta, and the U.S.

With respect to male youth, CTUMS 2006 results indicated that 9% of Canadian males aged 15 to 19 years and 17% of Canadian males aged 20 to 24 years of age had tried smokeless tobacco. In Alberta, 17% of males aged 15 to 19 years and 36% of males aged 20 to 24 years had tried smokeless tobacco.<sup>1</sup> The 2005 Youth Risk Behaviour Surveillance System in the U.S. found that 8% of American youth (14% male and 2% female) used smokeless tobacco in the 30 days before the survey.

## Water pipes

The concept of smoking tobacco through a water-pipe is not new; it is estimated that water-pipe smoking emerged among African and Asian peoples about four centuries ago. The water pipe is known by many names, including “narghile” in East Mediterranean countries, “shisha” in some North African countries, and “hookah” in India. Tobacco used in water pipes is often very moist, sweetened and flavoured, and is placed in the head of the pipe, which is attached to a conduit that passes through water.<sup>16</sup> Many believe that because the smoke passes through water before it is inhaled, using a water pipe is safer than other ways of smoking tobacco. However, one literature review notes that many diseases associated with cigarette smoking have been linked to water pipe smoking, including cancer, lung disease and cardiovascular disease.<sup>17</sup>

## Canada

In 2006, 1% of Canadians reported smoking a water pipe in the month before the survey, and 4% of Canadians reported having ever tried a water pipe.<sup>1</sup>

## Alberta

In 2006, 3% of Albertans reported having tried smoking a water pipe (rates of 30-day use were not reportable because of high sampling variability).<sup>1</sup>

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.



## Herbal cigarettes

Herbal cigarettes are made from ingredients such as clover flowers and rose petals, and do not contain tobacco or nicotine. There is little evidence about the health effects of herbal cigarettes; however, Health Canada has not deemed them a safe alternative to smoking regular cigarettes, because of the danger associated with inhaling smoke of any kind.<sup>18</sup>

### Canada

In 2006, 4% of Canadians reported ever smoking herbal cigarettes.<sup>1</sup>

### Alberta

In 2006, 5% of Albertans reported having tried herbal cigarettes (rates of 30-day use were not reportable because of high sampling variability).<sup>1</sup>

## Bidis

***Bidis generally contain higher concentrations of nicotine than name-brand cigarettes.***<sup>19</sup> Bidis (pronounced bee-dees) are small, hand-rolled cigarettes that have been gaining popularity, especially among young people. Made primarily in India, bidis consist of tobacco that is bundled in a tendu or temburni leaf. Tapered at both ends and tied with a colourful string, they look something like marijuana joints. They come in a variety of flavours, including chocolate, strawberry, wild cherry, liquorice and grape. Their flavours are youth-friendly, but their contents are not.

### Canada

Bidis use was not examined in 2006. However, according to the 2004 CTUMS results, 4% of Canadians had tried bidis.<sup>20</sup>

### Alberta

In 2004, 3% of Albertans had tried smoking bidis.

## United States

Studies in the U.S. show that bidi smoking is on the rise. One survey among young people in Massachusetts showed that 40% had smoked bidis at least once in their lifetime, and 8% had smoked 100 or more in their lifetime. A 2005 U.S. survey found that 3% of high school students and 2% of middle school students were current bidi smokers, and in 2004 it was found that 5% of U.S. adults had tried bidis.

## Summary

According to the 2005 Canadian Tobacco Use Monitoring Survey (CTUMS), 19% of Canadians 15 years and older were current smokers (a decrease of 6% since 1999). The same survey found that 21% of Albertans aged 15 years and older were current smokers (a decrease of 5% since 1999).

The highest rate of current smokers in Canada was found among young adults aged 20 to 24 (27% were current smokers).<sup>1</sup> The rate of current smokers among youth aged 15 to 19 was 15% in 2005 (16% of males and 14% of females).

In terms of gender, more males smoked than females both in Canada and in Alberta. This trend was found across most age groups and years.

In 2005, 10% of Canadian and Albertan youth classified themselves as puffers, but only 2% reported experimenting with cigarettes.

In Canada, a greater proportion of never smokers than current smokers completed university. With respect to employment, 21% of Canadian employees smoked, and 23% of Albertan employees smoked.

Aboriginal people had smoking rates much higher than the rates for Canada as a whole. In 2002/2003, 59% of the First Nations population smoked and in 1999, 72% of the Inuit population smoked.

Lastly, tobacco use in the form of chewing tobacco, snuff, cigars, pipes, and bidis was not common among Canadians and Albertans. However, there is an indication that certain groups are more likely to use particular types of tobacco products other than cigarettes.

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# HEALTH CONSEQUENCES OF TOBACCO USE

## Quick Facts

- Tobacco use is considered the single most significant cause of preventable illness, disability and premature mortality in Canada and in most other developed countries.
- Smoking is the leading cause of lung cancer; an estimated 85% to 90% of lung cancer cases are attributed to smoking.<sup>2,3</sup>
- Smoking also causes leukemia and cancers of the bladder, kidney, pancreas, oral cavity, pharynx, stomach, esophagus, cervix and larynx.<sup>17</sup>
- Smoking causes chronic obstructive pulmonary disease (COPD).<sup>17</sup> It is estimated that 75% of chronic bronchitis and emphysema cases result from smoking.<sup>3</sup>
- In addition to COPD, smoking causes acute respiratory illnesses and major respiratory symptoms.<sup>17</sup>
- Smoking causes coronary heart disease, stroke and diseases of the blood vessels.<sup>17</sup>
- Smoking has been linked to a plethora of other health problems (cataracts, hip fractures, low bone density in post-menopausal women, peptic ulcer disease, periodontitis, reduced fertility in women, etc.).<sup>17</sup>
- In 2002, an estimated 37,209 Canadian and 3,023 Albertan deaths were attributable to tobacco use.<sup>4</sup>

- Most tobacco-attributable deaths were from cancer, cardiovascular diseases and respiratory diseases.<sup>4</sup>
- Switching to “light” cigarettes does not lower the risk of tobacco-related disease.<sup>5</sup>
- Other tobacco products are linked to many of the same health problems as cigarettes.<sup>6-9</sup>



## HEALTH CONSEQUENCES OF TOBACCO USE

Tobacco use is considered the single most significant cause of preventable illness, disability and premature mortality in Canada<sup>1</sup> and in most other developed countries. The health hazards of tobacco use are a major concern worldwide not only in industrialized countries, but also in developing nations.<sup>3</sup>

- Over half of all lifetime tobacco users will die as a result of this use.<sup>3</sup>
- Tobacco use accounts for 12% of global adult mortality.<sup>3</sup>
- 10 million people worldwide will die by 2020 as a result of tobacco use.<sup>3</sup>
- In 2002, an estimated 37,209 Canadians and 3,023 Albertans died as a result of tobacco use.<sup>4</sup>

### Cigarette Smoking

***Many adults in Canada know that cigarette smoking is a serious health hazard, and that even occasional smoking is risky.***<sup>10</sup>

A 2005 public awareness campaign conducted in Alberta found that 76% of adults and 77% of youth disagreed with the statement that people had to smoke for many years before it will hurt their health. This suggests that most people recognize the health risks of tobacco use. Current adult smokers, however, were less likely to disagree (53%). Conversely, only 12% of both adults and youth believed that people have to smoke for many years before it will hurt their health.<sup>11</sup>

***Tobacco smoke contains many dangerous chemicals.***

There are over 4,000 chemicals in tobacco smoke, and 50 of them are known or suspected cancer causing agents.<sup>17</sup> Most of the chemicals (including carbon monoxide, formaldehyde and hydrogen cyanide) are created as a result of burning tobacco. The following is a list of some of the chemicals found in tobacco smoke and examples of products that contain these same chemicals:<sup>3</sup>

Chemicals found in tobacco smoke	Found or used in
acetone	paint stripper
arsenic	ant poison
butane	lighter fuel
cadmium	car batteries
carbon monoxide	car exhaust fumes
DDT	insecticide
formaldehyde	embalming fluid
hydrogen cyanide	poison gas
methanol	rocket fuel
nicotine	insect poison
phenol	toilet bowl disinfectant
propylene glycol	antifreeze
toluene	industrial solvent
vinyl chloride	plastics

Although the amount of chemicals in each cigarette is small, their effect is cumulative. That is, the amount of chemicals stored in the body increases with each puff of a cigarette. There are just over 10 puffs per cigarette. In a one-year period at a rate of one pack of cigarettes a day, a smoker will inhale about 73,000 puffs of dangerous chemicals.<sup>12</sup>

Smoking is related to various types of cancer, lung disease, heart disease and many other health problems. The following sections outline the known health effects of smoking (for information on the health effects of second-hand smoke, refer to the chapter “Second-hand Smoke”).

## Cancer

### Lung cancer

***The surgeon general concludes that there is a causal relationship between smoking and lung cancer.<sup>17</sup> An estimated 85% to 90% of lung cancer cases are attributed to smoking.<sup>2, 3</sup>***

#### ***How cancer attacks the lungs***

Cigarette smoke inhibits and damages the normal cleaning process by which the lungs get rid of foreign and harmful particles. Smoke destroys an important cleansing layer in the lungs, which in turn causes a build-up of mucus (resulting in “smoker’s cough,” an alternative way that the lungs use to try to clean themselves). The harmful cancer-producing particles in cigarette smoke are thus able to remain lodged in the mucus and develop into cancerous tumours.<sup>13</sup>

Lung cancer rates follow smoking rates, with a latency period of approximately 20 to 30 years from regular smoking exposure to onset of cancer.<sup>14, 15</sup>

***Lung cancer rates in Canada and Alberta***

Researchers have known for almost 50 years that smoking is a cause of lung cancer. In fact, lung cancer was one of the first diseases to be linked to smoking.<sup>1</sup> As mentioned, 85% to 90% of lung cancer cases are attributed to smoking.<sup>2,3</sup> Lung cancer has one of the lowest relative rates of survival of all the cancers. Among Canadian men and women, lung cancer continues to cause the primary cancer-related death: 29% of male and 26% of female deaths due to cancer are a result of lung cancer alone. In Canada, an estimated 19,900 deaths were due to lung cancer and there were an estimated 23,300 new cases identified in 2007.<sup>16</sup>

***Lung cancer rates in women are rising.***<sup>16, 17</sup>

About 20 to 30 years after smoking prevalence increases in a given population, lung cancer rates rise.<sup>15</sup> In Canada in 1993, after several decades of rapid increase, lung cancer incidence and mortality in women declined as a result of a decline in the proportion of young women who smoked in the mid-1970s.<sup>14</sup> This trend is also a concern in developing countries, where smoking prevalence is rapidly increasing among women.

Since 1993, lung cancer has been the leading cause of cancer death among Canadian women.<sup>14, 18</sup> Lung cancer continues to be the leading type of cancer among women, increasing to an estimated 8,900 deaths, compared with an expected 5,300 deaths due to breast cancer in 2007.<sup>16</sup> While these rates are increasing, they are roughly half as high as the rates among men.

***Lung cancer mortality***

Male smokers are 22 times and female smokers are 12 times more likely to die from lung cancer than non-smokers.<sup>19</sup> The survival rate for lung cancer is extremely low. The National Cancer Institute of Canada estimates that the death to cases ratio for lung cancer is 0.89, which means that about 89% of all lung cancer cases are fatal within five years of diagnosis.<sup>20</sup> Conversely, the risk of lung cancer drops steadily for people who quit smoking; after 10 years, it is cut by about half (30% to 50%).<sup>21</sup>

***Other Cancers******Lung cancer is not the only cancer caused by tobacco use.***

The U.S. surgeon general has identified an additional 10 types of cancer caused by smoking. Table 1 provides a summary of these cancers, along with estimates of new cases and deaths in Canada in 2007.



Table 1. Cancers caused by smoking, estimated new cases, and deaths, Canada 2007

Type of cancer	New cases	Deaths
Bladder cancer	1,700	520
Kidney cancer	1,800	620
Leukemia	1,750	980
Pancreatic cancer*	1,850	1,850
Oral cavity cancer	1,050	360
Pharyngeal cancer	Unknown	Unknown
Stomach cancer*	1,000	730
Esophageal cancer*	410	430
Cervical cancer	1,350	390
Laryngeal cancer	220	90

\* denotes one of the five lowest relative survival rates of all types of cancer Source: Canadian Cancer Society (2007)<sup>2</sup>

It is further estimated that smoking is responsible for

- 50% of bladder cancer cases in men<sup>22</sup>
- 40% of bladder cancer cases in women<sup>22</sup>
- 30% of kidney cancer cases in men<sup>23</sup>
- 24% of kidney cancer cases in women<sup>23</sup>
- 20% of all leukemia cases<sup>24</sup>
- 33% of all pancreatic cancer cases<sup>25</sup>
- 92% of cancers of the mouth, pharynx and larynx in men<sup>26</sup>
- 61% of cancers of the mouth, pharynx and larynx in women<sup>26</sup>
- 80% of all esophageal cancers (the disease is more common in men)<sup>21</sup>

In 2007, the Canadian Cancer Society estimated there would be 159,900 new cases of cancer in Canada, and that 72,700 Canadians would die from it.<sup>16</sup>

The U.S. surgeon general states that there is suggestive evidence that colorectal and liver cancer are caused by smoking, but that there is no causal relationship between smoking and prostate, brain, and breast cancer.<sup>17</sup>

## Respiratory Diseases

Smoking can cause a number of diseases that affect the lungs and airways of smokers, which are outlined below.

### Chronic obstructive pulmonary disease (COPD)

***Smoking causes COPD, which includes chronic bronchitis and emphysema.<sup>17</sup> Three-quarters of chronic bronchitis and emphysema cases are attributed to smoking.<sup>3</sup>***

COPD is a respiratory disorder characterized by inflammation of the lungs, which results in blockage, obstruction or damage by extra mucus.<sup>27</sup> The disease is manifested in two major forms: chronic bronchitis and emphysema. Both include symptoms of shortness of breath and difficulty breathing.<sup>27</sup>

COPD is considered a “silent” killer, in that affected persons do not experience significant symptoms until the disease becomes severe. Furthermore, the Canadian Thoracic Society notes that COPD is a disease that is under-reported and under-diagnosed, yet many people are dying from the disease.<sup>28</sup> In 1997, Statistics Canada reported that COPD was the fourth leading cause of death in Canada.<sup>29</sup>

### Other respiratory diseases

***Smoking has other detrimental effects on the lungs, including acute respiratory illness, asthma and general respiratory symptoms.***

#### *Acute Respiratory Illnesses*

The U.S. surgeon general concludes that there is a causal relationship between smoking and acute respiratory illnesses.<sup>17</sup> This includes influenza, lower and upper respiratory tract infections and pneumonia.

#### *Asthma*

The U.S. surgeon general states that there is inadequate evidence to link active smoking and asthma in children, adolescents, and adults.<sup>17</sup> However, smoking is related to poor asthma control in adults, and asthma-related symptoms (e.g., wheezing) in childhood and adolescence.<sup>17</sup>

Exposure to second-hand smoke (SHS, also referred to as “environmental tobacco smoke” or “passive smoking”) in children, especially maternal smoking, may be a significant risk factor for asthma. Although active smoking appears not to be a significant risk factor for asthma, it is associated with lower quality of life, reduced lung function, and increased health care utilization for asthma-related mortality.<sup>30</sup>

(Refer to the chapter “Second-Hand Smoke” for more information.)

### General Respiratory Symptoms

Smoking is a cause of all major respiratory symptoms among adults. This includes wheezing, coughing, phlegm, and dyspnea (difficulty or pain when breathing).<sup>17</sup>

### Cardiovascular Disease

***Smoking causes coronary heart disease, stroke and diseases of the blood vessels.***<sup>17</sup>

Smoking has an immediate effect on the heart in the following ways:

- **Decreases the amount of oxygen that is carried in the blood**

Carbon monoxide and other gases compromise the amount of oxygen in the blood so that the heart has to work harder to get an adequate supply of oxygen.<sup>31</sup>

- **Increases the heart rate**

The nicotine in tobacco causes the heart rate to increase and can elevate blood pressure. The heart beats faster to get more oxygen by pumping a greater volume of oxygen-poor blood.<sup>31</sup>

- **Decreases the size of blood vessels**

A build-up of fat deposits associated with nicotine and carbon monoxide makes blood vessels and arteries smaller, which limits the blood supply to the heart.<sup>31</sup>

Over time, smoking can cause severe damage to the heart and arteries, and can lead to the following conditions.

### Coronary heart disease

***Smoking causes coronary heart disease***

Coronary heart disease (CHD) is a result of atherosclerosis (a build up of fat deposits in the blood system) of the coronary arteries. This leads to myocardial infarction, ischemic heart disease and angina pectoris.<sup>17</sup> Smoking causes both atherosclerosis and CHD.<sup>17</sup> Approximately 25% of ischemic heart disease cases are a result of smoking.<sup>3</sup>

Smokers have a 70% chance of dying from CHD. In fact, smoking more than 40 cigarettes a day increases one's chance of dying by 200% to 300% in comparison to non-smokers.<sup>32</sup> Furthermore, smokers have two to four times greater risk for heart attacks and sudden death from CHD than non-smokers.<sup>33</sup> Approximately 41% of deaths from CHD in women under the age of 65 are attributable to cigarette smoking.<sup>34</sup>



Even one day after quitting smoking, the heart, blood and blood pressure show improvements. One year after quitting, the risk of dying from coronary heart disease is cut by half. The risk continues to drop after one year, returning to normal after about 15 years. The risk of stroke also returns to the level of a non-smoker's within five to 15 years of cessation. After 15 years, the risk of coronary heart disease is similar to that of a never-smoker, and the overall risk of death is almost the same, especially if the smoker quits before illness develops.<sup>21</sup>

## Cerebrovascular disease (Stroke)

***The U.S. surgeon general concludes that there is a causal relationship between smoking and stroke.<sup>17</sup>***

Cerebrovascular disease is a syndrome of interrupted arterial blood flow to the brain.<sup>17</sup> Depending on what part of the brain is affected, there can be transitory (transient ischemic attack) or permanent (stroke) effects. The risk of suffering a stroke is approximately 50% higher in smokers than in non-smokers and is dose-dependent (that is, the risk increases with the number of cigarettes smoked per day). For example, smokers who consume more than 25 cigarettes per day have the highest risk of a stroke.<sup>35-37</sup>

## Abdominal aortic aneurysm

An aortic aneurysm is a bulging or ballooning in the abdominal portion of the body's largest artery, the aorta. Most aortic aneurysms are asymptomatic (show no symptoms) as they enlarge, and may rupture and cause instant death.<sup>38</sup> Smoking is a causal risk factor in the development of an abdominal aortic aneurysm.<sup>17</sup> The relationship has been shown to be dose-dependent and the risks are lower in former smokers than in current smokers.<sup>17</sup>

## Other Health Problems

***Smoking is associated with a number of other health problems. According to the U.S. surgeon general, in addition to cancer, respiratory and cardiovascular diseases, smoking can cause a number of other health problems, such as<sup>17</sup>***

- cataracts
- hip fractures
- low bone density in post-menopausal women
- peptic ulcer disease in people who are infected with the bacterium *Helicobacter pylori*, which is a bacteria that causes inflammation of the stomach and intestine
- periodontitis
- reduced fertility in women
- poorer overall health than non-smokers
- increased risk for complications when undergoing surgery (e.g., decreased wound healing and increased respiratory complications)

The following diseases are related to smoking, although more research is needed before a causal relationship can be determined:<sup>17</sup>

- Root-surface caries (tooth decay)
- Low bone density in older men
- Erectile dysfunction
- Age-related macular degeneration
- Ophthalmopathy associated with Graves' disease
- Bowel disorders (e.g., Crohn's Disease)<sup>43, 44</sup>
- Gastroesophageal reflux disease (symptoms include heartburn and acid regurgitation)<sup>45</sup>
- Hearing impairment<sup>46</sup>
- Hoarseness and vocal cord inflammation<sup>45</sup>
- Hormone-related problems (including earlier female and male menopause)<sup>47, 48</sup>
- Increased injuries<sup>49-51</sup> (including increased motor vehicle collisions, fire-related injuries,<sup>52</sup> and exercise-related injuries) and deaths related to injuries<sup>53</sup>
- Increased severity of rheumatoid arthritis<sup>54-56</sup>
- Menstrual disorders<sup>57, 58</sup>
- Skin problems including acne<sup>59</sup> and psoriasis<sup>60</sup>
- Sleeping problems<sup>61, 62</sup>
- Thyroid disease<sup>63-65</sup>
- Type 2 diabetes<sup>66</sup>
- Tuberculosis<sup>67</sup>

Women smokers who use oral contraception are at even greater risk for ischemic stroke and myocardial infarction (heart attack), particularly women over 35.<sup>39, 40</sup>

Erectile dysfunction (impotence) is estimated to occur in 52% of all men aged 40 to 70 years.<sup>41</sup> Cigarette smoking almost doubles the likelihood of moderate or complete erectile dysfunction. Cigar smoking and exposure to environmental tobacco smoke (ETS) also significantly increases the risk of impotence.<sup>42</sup>

In Canada, smokers' materials are the leading cause of fire deaths. One in five fire deaths in Canada and one in four fire deaths in Alberta are due to fires ignited by smokers' materials. Smokers' materials are sources of ignition, such as cigarettes, pipes, cigars, matches and lighters, which are used in conjunction with smoking.<sup>52</sup>

## Estimating Tobacco-Attributable Mortality and Potential Years of Life Lost

### Tobacco-attributable mortality

Tobacco-attributable mortality is an estimate of the deaths caused by tobacco. It is calculated using mortality data, rates of tobacco use, and relative risk ratios for certain diseases that are known to be partially caused by tobacco.

### Tobacco-attributable mortality in Canada and Alberta

In Canada, the estimated number of tobacco-related deaths was 37,209 (23,766 male and 13,443 female deaths) in 2007.<sup>4</sup> This constituted 17% of all Canadian deaths (21% of male and 12% of female deaths).<sup>4</sup> The estimated number of Albertan tobacco-related deaths was 3,023 (1,921

Smoking kills more people than HIV/AIDS, motor vehicle collisions, murder, suicide and illicit drug use combined.<sup>68</sup> Since 1991, the number of tobacco-related deaths in Canada has increased by an estimated 8%. Almost two-thirds (64%) of the increase is attributable to deaths among females.<sup>69</sup>

male deaths and 1,102 female deaths).<sup>4</sup> As shown in Table 2, cancers account for the most tobacco-attributable deaths, followed by cardiovascular diseases and respiratory diseases.

Table 2. Tobacco-attributable mortality, Canada and Alberta, 2002

Tobacco-attributable disease	Canada	Alberta
<b>Cancers:</b> lip, oral cavity, pharynx, esophagus, pancreas, larynx, trachea, lung, bronchus, cervix uteri, urinary bladder, other urinary	17,427	1,305
<b>Cardiovascular:</b> rheumatic heart disease, hypertension, ischemic heart disease, pulmonary heart disease, other heart disease, cerebrovascular disease, atherosclerosis, aortic aneurysm, other arterial disease	10,275	928
<b>Respiratory:</b> respiratory tuberculosis, pneumonia/influenza, bronchitis/emphysema, asthma, chronic airways obstruction	8,282	682
<b>Passive smoking deaths:</b> deaths among non-smokers from lung cancer and ischemic heart disease attributable to passive smoking	831	72
<b>Other causes</b> (e.g., fires, intestinal diseases, etc.)	302	27
<b>Pediatric diseases</b> (less than one year of age): low birth weight, respiratory distress syndrome, respiratory conditions (newborn), sudden infant death syndrome	92	10

Note: Totals may differ due to weighting estimates Source: Rehm et al. (2006)<sup>4</sup>

### Potential years of life lost

Potential years of life lost (PYLL) is a calculation of the number of years of life lost when someone dies prematurely. PYLL is calculated using mortality estimates and represents the difference between life expectancy and age of death for persons of the same age and gender.

### PYLL in Canada and Alberta

In Canada, PYLL as a result of smoking was estimated at 515,607 in 2002 (316,417 for males and 199,191 for females).<sup>4</sup> Cancer is the leading cause of PYLL at 262,261, followed by cardiovascular diseases at 151,604 and respiratory diseases at 79,328.<sup>4</sup> These three diseases combined account for 17% of all potential years of life lost in Canada.<sup>4</sup> It is further estimated that smoking accounts for 28% of potential years of life lost due to cancer in Canada.<sup>16</sup> In Alberta, PYLL as a result of smoking was estimated at 27,637 in 2002.<sup>4</sup>

It is estimated that, on average, smokers lose about 15 years of their lives. Those who die before age 70 (about half of all smokers) lose an average of 22 years; those who die after age 70 lose an average of eight years.<sup>70</sup> Even at age 35, a smoker's life expectancy is reduced by 10% to 20%.<sup>71</sup>



***Quitting smoking is the best way to reduce the health risks associated with tobacco use.***

Even smokers who only smoke one to four cigarettes per day have an increased risk of dying from tobacco-related diseases than non-smokers.<sup>72</sup> The only way smokers can reduce their risk of premature death to those of a non-smoker is by quitting. On average, people who quit smoking before the age of 50 cut their risk of premature death by half.<sup>21</sup> Smoking cessation has major and immediate health benefits for all smokers, young and old, sick and well.<sup>73-75</sup> It is a key step that smokers can take to enhance the length and quality of their lives.

## The "Light" Myth

***Switching to "light" or "mild" cigarettes does not necessarily lower the risk of tobacco-related disease.<sup>5</sup>***

Many smokers believe that light cigarettes are less damaging because they are less harsh and have lower amounts of tar and nicotine.<sup>76</sup> But the amounts indicated on the side are misleading. Research shows that light cigarettes can yield levels of tar and nicotine that are higher than the levels recorded on the sides of the packages.<sup>77</sup> In some cases, light cigarettes can yield nicotine levels that are even higher than some regular cigarettes.<sup>78</sup> Consuming light cigarettes is unlikely to substantially reduce the risk of disease, and may in fact increase the risk because light-cigarette smokers tend to smoke more, or put off quitting, because they believe that light cigarettes are safer.<sup>5, 79</sup>

### ***Tar and nicotine levels***

Tar, nicotine and carbon monoxide values are based on measurements taken by smoking machines using specific laboratory parameters as defined by either the International Organization for Standardization (IOS) or the Federal Trade Commission (FTC).<sup>78</sup> Smoking machines test cigarettes by taking periodic puffs (usually one per minute) and puffing for a specified duration (for example, two seconds), and this process is continued until a predetermined butt length is reached.<sup>80</sup>

***Measuring nicotine and tar levels with smoking machines is problematic.***

Smoking machine yields have been found to be lower than human yields, which may be a result of several factors. The first factor is ventilation holes in cigarettes. The majority of Canadian (91%) and American (94%) cigarettes have tiny air holes cut into the filter, which allow air to enter the filter and dilute the smoke.<sup>81</sup> These holes, however, are often covered up by the smoker's fingers or lips, yielding much higher amounts of toxins that machines do not replicate.<sup>82</sup> People are also highly individual in their smoking behaviour (e.g., puffs taken per cigarette, puff volume, puff interval, puff frequency, depth and duration of inhalation), and studies show that many people inhale more deeply or more often than a machine.<sup>83, 84</sup> Taken together, this evidence suggests that the way in which a cigarette

A cigarette that is labelled as yielding 6 mg of tar can actually yield four times as much if it is smoked intensely.<sup>77</sup>

is smoked is one of the most important factors in determining a person's actual exposure to tar, nicotine and carbon monoxide, and that the designation of "light" or "mild" is deceptive.

***Many Canadians and Albertans smoke light or mild cigarettes.***

The 2006 Canadian Tobacco Use Monitoring Survey (CTUMS) found that 39% of Canadian smokers smoked regular cigarettes, 41% smoked light or mild cigarettes, and 17% smoked ultra-light, ultra-mild, extra-light or extra-mild cigarettes. A number of those who reported smoking lighter or milder cigarettes had some mistaken notions about the results of smoking lighter or milder cigarettes:<sup>85</sup>

- 11% believed that choosing these rather than regular cigarettes enabled them to reduce smoking risks without needing to quit
- 19% believed that they inhaled less tar than they would if they smoked regular cigarettes
- 13% felt that their health risks were lower than they would be if they smoked regular cigarettes

In Alberta, the 2006 CTUMS results indicated that 37% of smokers smoked regular cigarettes, 42% smoked light or mild cigarettes, and 19% smoked ultra-light, ultra-mild, extra-light or extra-mild cigarettes. As was the case nationally, CTUMS found that some who reported smoking lighter or milder cigarettes in Alberta had misconceptions about the benefits of this choice:<sup>85</sup>

- 9% believed that choosing these rather than regular cigarettes enabled them to reduce smoking risks without needing to quit
- 23% believed that they inhaled less tar than they would if they smoked regular cigarettes
- 13%<sup>†</sup> felt that their health risks were lower than they would be if they smoked regular cigarettes

## Other Tobacco

### Cigars and pipes

***Cigars and pipes are not safe alternatives.***

Smokers who switch from cigarettes to cigars tend to inhale more than cigar smokers who have never smoked cigarettes.<sup>6</sup> Cigar smoke is at least as toxic as cigarette smoke, and a large, premium cigar is estimated to produce as much smoke as 15 to 20 cigarettes.<sup>86</sup> Risks for lung cancer, COPD and coronary heart disease are high for cigar smokers.<sup>7</sup> The risk of oral cancer increases with both the depth of inhalation and the number of cigars smoked per day.<sup>86</sup> Cancer of the oral cavity includes cancers of the lip, tongue, cheek, gums, roof and floor of the mouth, and larynx

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

(voice box). The risk for these cancers is at least as high for daily cigar smokers as it is for cigarette smokers.<sup>6</sup>

Even cigar and pipe smokers who do not inhale are at a greater risk for oral cancer and cancer of the larynx and esophagus than those who do not smoke.<sup>6,9</sup> Not surprisingly, quitting pipe or cigar smoking leads to reduced risk of oral cancer compared with continuing to smoke.<sup>8,9</sup>

### Smokeless Tobacco

***There are many health problems associated with smokeless tobacco.***

Smokeless tobacco contains over 3,000 chemicals,<sup>87</sup> including 28 known carcinogens (cancer-causing compounds).<sup>88</sup> Not surprisingly, a variety of health problems can be caused by or are associated with the use of smokeless tobacco:<sup>89-94</sup>

- cancer of the mouth and throat
- leukoplakia (pre-cancerous patches)
- gum and tooth disease
- gum recession
- loss of bone in the jaw
- tooth abrasion
- yellowing of teeth
- chronic bad breath
- cardiovascular problems

(Refer to the chapter “Smokeless Tobacco” for more information.)

### Bidis

Bidis (pronounced bee-dees) are small, hand-rolled cigarettes that come in a variety of flavours (e.g., chocolate, strawberry, etc). Although they contain less tobacco than cigarettes, they have a higher concentration of nicotine,<sup>95</sup> and have been linked to

- oral cancer<sup>96</sup>
- lung cancer<sup>97</sup>
- stomach cancer<sup>98</sup>



## Summary

Smoking causes disease and death. Lung cancer is one of the most well-known health consequences, and smoking causes 85% to 90% of all lung cancer cases. Smoking causes leukemia and cancers of the bladder, kidney, pancreas, oral cavity, pharynx, stomach, esophagus, cervix and larynx.

Besides causing cancer, smoking causes various respiratory diseases and illnesses, including chronic obstructive pulmonary disease. It also causes heart disease, stroke and diseases of the blood vessels. Smoking is also linked to a plethora of other health problems (e.g., cataracts, hip fractures, low bone density in post menopausal women, peptic ulcer disease, periodontitis, reduced fertility in women).

In 2002, an estimated 37,209 of Canadian and 3,023 of Albertan deaths were attributable to tobacco. Most tobacco-related deaths were a result of cancer, cardiovascular diseases and respiratory diseases.

Switching to “light” or “mild” cigarettes does not lower the risk of tobacco-related disease<sup>5</sup>, nor does switching to other tobacco products. Instead, cessation and reduction efforts can assist smokers in lowering their risk of tobacco-related diseases.

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# YOUTH AND SMOKING

## Quick Facts

- Experimentation with tobacco is declining among Alberta youth. The proportion of Alberta youth in grades 5 to 9 who reported ever trying a tobacco product declined from 39% in 1994 to 19% in 2002 and to 18% in 2004/2005.<sup>1</sup>
- Prevalence of daily or occasional smoking among Alberta youth aged 15 to 19 was 15% in 2006, down from 19% in 2006.<sup>2</sup>
- According to the 2006 CTUMS, 40% of Albertans aged 15 to 19 who have ever smoked a cigarette had done so by age 14.<sup>2</sup>
- On average, Alberta youth aged 15 to 19 who have ever smoked have tried their first cigarette at 15 years of age.<sup>2</sup>
- Youth who smoke in Alberta get their cigarettes from non-commercial or social sources (such as parents, siblings and other family members, friends, acquaintances, and even strangers) and commercial sources (such as tobacco retailers, Internet vendors, and vending machines).<sup>3-6</sup>
- As youth get older, they are more likely to obtain cigarettes from commercial sources.<sup>1, 2, 7, 8</sup>
- In 2005, 85% of Alberta retailers refused to sell tobacco to youth.<sup>9</sup>
- Youth in Alberta under the age of 18 who are in possession of tobacco or are using tobacco in a public place may be fined \$100 and have the product confiscated.<sup>10</sup>

- Genetics and environment interact to influence smoking behaviour.<sup>11, 12</sup>
- Youth who have parents, siblings, or friends who smoke are more likely to smoke.<sup>13-16</sup>
- Cigarette smoking during adolescence reduces the rate of lung growth and function, increases the risk of respiratory problems and infections, increases heart rate, and increases blood pressure. Youth who smoke may be ostracized by non-smoking youth.<sup>17-20</sup>
- Nearly 90% of Alberta youth are taught about smoking in school, yet many youth underestimate the risks related to smoking.<sup>1, 21-23</sup>
- Many youth want to quit but need help to do so.<sup>24-26</sup>
- There are established guidelines that are useful to develop school tobacco policies and youth smoking cessation and reduction programs.<sup>24, 27</sup>

## Definitions

### CTUMS

**Current smoker:** person who currently smokes cigarettes daily or occasionally

**Daily smoker:** person who currently smokes cigarettes every day

**Non-daily smoker:** person who currently smokes cigarettes, but not every day

**Non-smoker:** person who currently does not smoke cigarettes

**Former smoker:** person who has smoked at least 100 cigarettes in his life, but currently does not smoke

**Experimental smoker:** person who has smoked at least one cigarette, but less than 100 cigarettes, and currently does not smoke cigarettes

**Ever smoker:** person who is a current smoker or a former smoker

**Never smoker:** person who was an experimental smoker or who is a lifetime abstainer

### YSS

**Current smoker:** a person who has smoked at least 100 cigarettes in his or her lifetime, including

**Current daily:** a current smoker who has smoked at least one cigarette per day for each of the 30 days preceding the survey

**Current non-daily:** a current smoker who has smoked at least one cigarette during the past 30 days, but has not smoked every day

**Former smoker:** a person who has smoked at least 100 cigarettes in his or her lifetime and has not smoked at all during the past 30 days

**Experimental smoker:** a person who has smoked at least one whole cigarette and has smoked in the last 30 days

**Former experimental smoker:** a person who has smoked at least one whole cigarette and has not smoked at all in the past 30 days

## YOUTH AND SMOKING

Youth smoking is a significant public health concern. This chapter examines topics related to tobacco use, factors affecting use, and cessation.

Current research and data will be presented and, where appropriate, interpreted according to predominant theories regarding smoking by young people. Information in this chapter is drawn from the research literature and from the survey results of

- the Youth Smoking Survey (YSS), which surveyed youth in grades 5 through 9 across Canada<sup>1</sup>
- the Canadian Tobacco Use Monitoring Survey (CTUMS), which surveyed youth aged 15 years and older across Canada<sup>2</sup>
- the Alberta Youth Experience Survey (TAYES), which surveyed youth from grades 7 to 12 across Alberta in 2005<sup>7</sup>

The use of multiple surveys is advantageous for many reasons. For instance, the above surveys cover different age groups, and analysis of these different age groups provides a more comprehensive picture of youth smoking. These surveys use different questions and this allows for a variety of information to be reported. As well, the YSS and CTUMS sample populations across Canada and Alberta while TAYES focuses on Alberta, thus providing a national and provincial perspective. When reading the results of these surveys, it is important to consider that surveys may use different definitions of smoking status and smoking-related variables (e.g., the YSS and CTUMS differ in their definition of "current smoker").

## Prevalence of Youth Smoking

*National and provincial rates of smoking experimentation and maintenance are declining.*

### Canada

#### Grades 5 to 9

The YSS results indicated that the rates of Canadian youth ever trying a cigarette (grades 5 to 9) declined from 40% in 1994 to 19% in 2004/2005. Of the youth surveyed in 2004/2005, 81% had never tried a cigarette, not even a few puffs; 10% had tried smoking but never smoked an entire cigarette (were puffers); 5% were former smokers or former experimental smokers; 2% were experimental smokers; and 2% were current smokers.<sup>1</sup> There has been a decline the prevalence of experimenters and puffers since 1994 (see Figures 1 and 2).



## Ages 15 to 19

Results from the 2006 CTUMS indicated that smoking rates for Canadian teens (aged 15 to 19 years) have declined from 28% in 1999 to 18% in 2005 and to 15% in 2006 (see Figure 3). In 2006, current smokers (daily and occasional) smoked an average of 11 cigarettes per day. Also in 2006, males had a smoking rate of 16% and females 14%. Males smoked approximately 13 cigarettes per day and females smoked approximately 11 cigarettes per day.<sup>2</sup>

## Alberta

### Grades 5 to 9

The prevalence of Alberta youth who reported trying a tobacco product declined from 39% in 1994 to 18% in 2004/2005.<sup>1</sup> The prevalence of experimental smokers and puffers has also declined, as illustrated in Figure 1 and Figure 2.

### Definitions continued

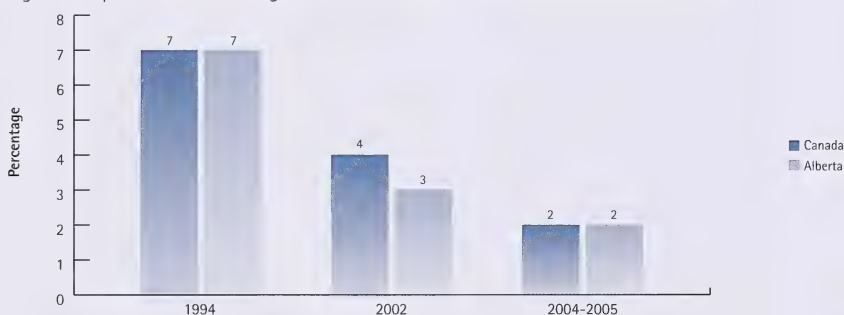
**Puffer:** someone who has just tried a few puffs of a cigarette, but has never smoked a whole cigarette

**Ever tried a cigarette:** someone who has ever tried a cigarette, even a few puffs

**Never tried a cigarette:** someone who has never tried a cigarette, not even a few puffs

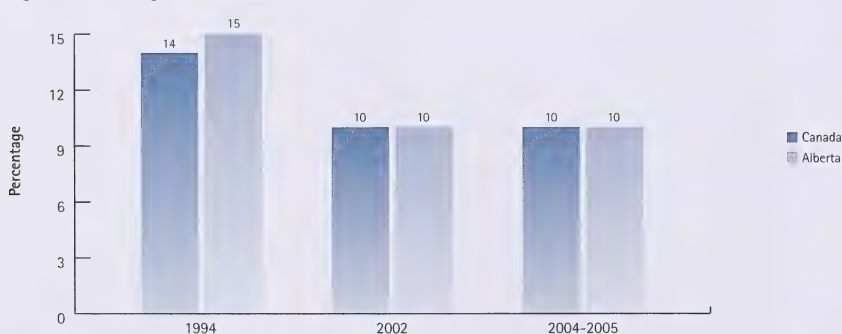
**Prevalence of smoking:** the proportion of cigarette smokers in the target population

Figure 1. Experimental smokers, grades 5 to 9, Canada and Alberta, 1994, 2002, 2004-2005



Source: Youth Smoking Survey (2004-2005)<sup>1</sup>

Figure 2. Puffers, grades 5 to 9, Canada and Alberta, 1994, 2002, 2004-2005



Source: Youth Smoking Survey (2004-2005)<sup>1</sup>

## Grades 7 to 12

According to The Alberta Youth Experience Survey (TAYES) 2005, 25% of students in grades 7 through 12 reported ever smoking in their lifetime and 14% of all students reported smoking in the 30 days preceding

the survey. Conversely, 75% of students reported never smoking tobacco in their lifetime and 86% reported not smoking tobacco in the 30 days preceding the survey.<sup>7</sup>

### Ages 15 to 19

The 2006 CTUMS found that 15% of Alberta youth aged 15 to 19 were current smokers. As shown in Figure 3, this is 4% lower than the rate for 2005 (19%) and 11% lower than the rate found for the 1999 sample (26%). Additionally, in 2005, youth smoked approximately 11 cigarettes per day, which is slightly lower than the number of cigarettes youth smoked in 1999 (12 cigarettes per day).<sup>2</sup> Males smoked approximately 10 cigarettes per day and females smoked approximately 11 cigarettes per day.<sup>2</sup>

Figure 3. Current smokers, age 15 to 19 years, Canada and Alberta, 1999-2006



Source: Canadian Tobacco Use Monitoring Survey (1999 to 2006)<sup>2</sup>

## Youth Beliefs and Attitudes About Smoking

*Although youth are taught about smoking in school, they still have misperceptions about smoking behaviour.*

### Youth comments

"You never actually think when you take a puff of smoke that your lungs are getting black and your heart is becoming enlarged the more you do it."

### Canada and Alberta

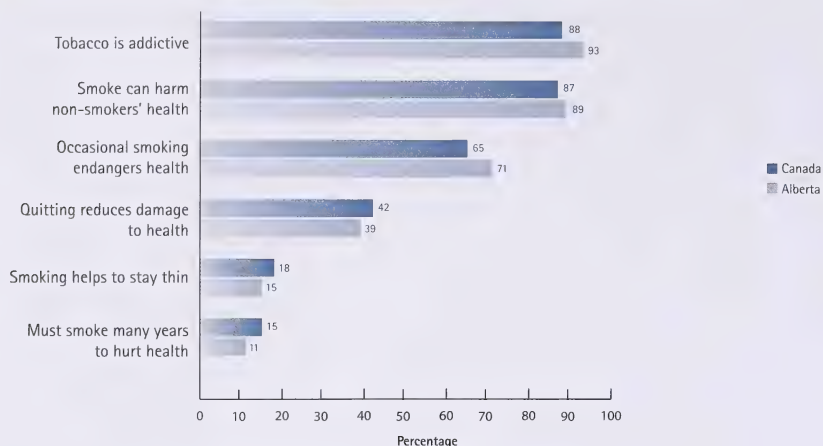
#### Grades 5 to 9

Youth need accurate knowledge to help them make good decisions about smoking. The 2004/2005 YSS assessed youths' attitudes, beliefs, and awareness regarding smoking and health problems. Survey findings indicated that 89% of Alberta youth reported that they had been taught in school about smoking behaviour and the health consequences.

The survey also indicated that a large proportion of Alberta youth from grades 5 to 9 (93%) believed that people can indeed become addicted to tobacco and a small proportion of youth (2%<sup>†</sup>) believed smoking was "cool" (see Figures 4 and 5). However, 35% believed that smoking can help people relax, 30% thought smokers could quit anytime they wanted and 14% thought that smoking could help people when they are bored (see Figure 5).<sup>1</sup> Research literature also suggests youth are overly optimistic about the risks involved with smoking.<sup>22, 23, 29</sup>

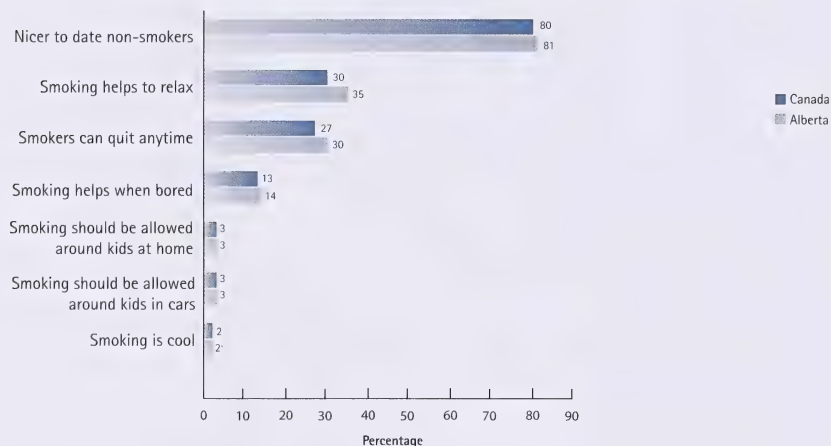
<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

Figure 4. Beliefs about tobacco and health among Canadian and Albertan youth, grades 5 to 9, 2004-2005



Source: Youth Smoking Survey (2004-2005)<sup>†</sup>

Figure 5. Attitudes about tobacco and health among Canadian and Albertan youth, grades 5-9, 2004-2005



<sup>†</sup> Indicates moderate sampling variability, interpret with caution.

Source: Youth Smoking Survey (2004-2005)<sup>†</sup>

## Ages 15 to 19

Results from the 2006 CTUMS indicated that 62% of Canadian and 59% of Albertan youth aged 15 to 19 believed smoking should not be permitted in restaurants, whether indoor or outdoor; 98% of Canadian and 99% of Albertan youth thought there should be some form of smoking restriction in a restaurant (i.e., an enclosed smoking section, a designated section, or no smoking at all).<sup>2</sup> Of 15- to 19-year-olds, 35% of Canadians and 31% of Albertans thought smoking should not be allowed in bars; 85% of Canadians and 81% of Albertans thought there should be some form of smoking restriction in a bar (i.e., an enclosed smoking section, a designated section, or no smoking at all). Lastly, of those aged 15 to 19, 37% of Canadians

and 33% of Albertans thought smoking should not be permitted in the workplace, whether indoor or outdoor; 98% of Canadians and 99% of Albertans thought there should be some form of smoking restriction in the workplace (i.e., an enclosed smoking area, a designated outdoor smoking area, or no smoking at all).

## Alberta

### Grades 7 to 12

The 2005 TAYES found that youth in grades 7 to 12 generally supported smoking restrictions. Of Alberta youth in grades 7 to 12, 76% believed smoking should be banned in all public places and 75% believed smoking should be banned in all workplaces.<sup>7</sup> However, there were disparate opinions on smoking policy contingent on whether youth were current smokers or never smokers. For instance, 79% of youth (aged 11 to 17) who were never smokers agreed that smoking should be banned in all places, whereas only 23% of current youth smokers agreed.<sup>28, 30</sup>

## Smoking Initiation

***Canadian and Albertan youth who smoke or try smoking typically do so by the age of 14 and many have tried by the age of 11.***

## Canada

### Grades 5 to 9

In Canada, according to the YSS results, 30% of students in grades 5 to 9 had been curious about smoking a cigarette. Most students said they would either probably not (24%) or definitely not (61%) try smoking cigarettes in the future. Of Canadian students who had smoked a whole cigarette, 37% had smoked their first whole cigarette by age 11 and 63% smoked their first whole cigarette between the ages of 12 and 15.

### Ages 15 to 19

The 2006 CTUMS found that, on average, Canadian youth aged 15 to 19 who had smoked a cigarette did so at 14 years of age. For youth aged 15 to 19 who smoked daily, 40% reported smoking on daily a basis by age 14.

## Alberta

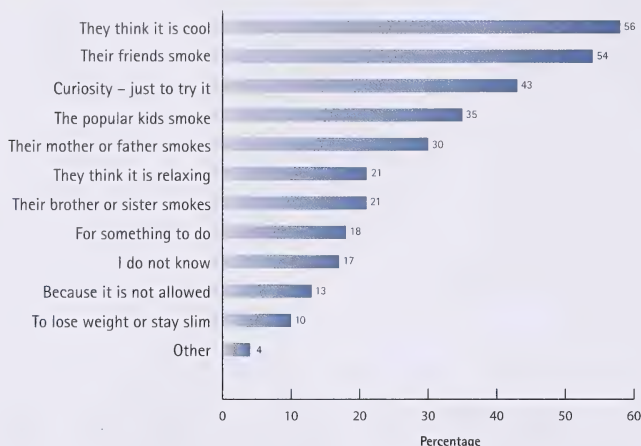
### Grades 5 to 9

According to the 2004/2005 YSS results, 32% of Alberta students in grades 5 to 9 had been curious about smoking a cigarette. Most students reported they would probably not (23%) or definitely not (64%) try smoking cigarettes in the future. However, as grade level increased, significantly more students were curious about smoking. Of Albertan students who had smoked a whole cigarette, 36% tried their first whole cigarette at 11 years of age or younger and 64% smoked their first whole cigarette between the ages of 12 and 15.



As shown in Figure 6, the 2004/2005 YSS revealed some of the reasons Alberta youth believed youth their age started smoking. The two most common reasons cited were that “they think it is cool” (58%) and that “their friends smoke” (54%).

Figure 6. Alberta youth in agreement with statements about why youth start to smoke, grades 5 to 9, 2004–2005



Source: Youth Smoking Survey (2004–2005)<sup>1</sup>

### Grades 7 to 12

In TAYES (2005), students in grades 7 through 12 were asked how old they were when they first smoked a whole cigarette. Of students who reported ever smoking, 19%<sup>1</sup> reported trying their first whole cigarette at age 11 or younger, 48% did so between the ages of 12 and 14, and 34% reported doing so at age 15 or older. Of past-30-day smokers, 17% smoked their first whole cigarette by 11 years of age or younger, 47% did so between the ages of 12 to 14, and 36% did so at age 15 or older.

### Ages 15 to 19

The 2006 CTUMS found that 40% of Alberta youth aged 15 to 19 who had smoked a cigarette first did so by age 14. Of youth aged 15 to 19 who smoked daily, 22% reported smoking daily by age 14 and 48% began smoking daily by age 15. On average, youth aged 15 to 19 who had smoked a cigarette did so at 15 years of age.

## Youth Access to Cigarettes

***Youth obtain cigarettes from commercial and social sources.***

***As youth get older, they are more likely to get cigarettes from commercial sources.***

In developing a comprehensive view of youth smoking behaviour, it is

<sup>1</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

A 2004 U.S. study had youth use the Internet to find a tobacco vendor and purchase one carton of cigarettes. Ninety-seven per cent found an online tobacco vendor and most youth placed an order within seven minutes. Almost 80% of the youth received tobacco in the mail and 91% of the orders were delivered without a request for proof of age. Additionally, the study found online cigarettes tended to be cheaper than other commercial sources. This study reflects the ease of access and lack of regulation involved in purchasing cigarettes from the Internet and the subsequent need to examine and evaluate youth access to cigarettes.<sup>34</sup>

#### Youth comments

"You can find them anywhere like in grocery stores or in gas stations."<sup>28</sup>

"You can get an older person who smokes to buy them for you."<sup>28</sup>

"If your parents smoke, then they have cigarettes lying around the house."<sup>28</sup>

useful to consider the range of sources and methods that youth use to obtain tobacco products. The ways in which youth obtain tobacco products include purchasing, stealing, and sharing or being given tobacco products.<sup>31-33</sup> In general, as youth get older they obtain cigarettes from commercial sources more often and from social sources less often.<sup>1, 2, 7, 8</sup> Providers of tobacco products include commercial sources (such as tobacco retailers, Internet vendors, and vending machines)<sup>3-6</sup> and non-commercial or social sources (such as parents, siblings and other family members, friends, acquaintances, and even strangers).<sup>3</sup>

#### Canada

The 2004/2005 YSS found that the majority (91%) of Canadian youth in grades 5 to 9 who reported smoking in the past 30 days indicated they obtained their cigarettes from social sources. Social sources included buying them from someone, asking someone to buy them, and getting them from friends, parents and siblings.

#### Alberta

According to TAYES 2005, over three-quarters (78%) of students in grades 7 to 12 got their cigarettes from a social source. Social sources for cigarettes included buying them from someone, asking someone to buy them, and getting them from friends, parents, and siblings. According to the 2005 TAYES results, 29% of youth in grades 7 through 12 reported it would be difficult, very difficult or impossible to get cigarettes if they wanted to and 71% reported it would be easy or very easy to do so. Males and females reported similar levels of access to cigarettes; 71% of males and 72% of females reported that it would be easy or very easy to get cigarettes. Students in grades 7 to 9 were more likely than those in grades 10 to 12 to find it difficult, very difficult or impossible to get cigarettes. Specifically, 59% of students in grades 7 to 9 reported that it would be difficult, very difficult or impossible to get cigarettes, versus 15% of students in grades 10 to 12. Conversely, 41% of students in grades 7 to 9 thought it would be easy or very easy to get cigarettes, whereas 85% of students in grades 10 to 12 reported that it would be easy or very easy to get cigarettes. Students with low and moderate levels of parental monitoring reported easier access to cigarettes than students with high levels of parental monitoring.<sup>1</sup>

Findings from the literature reveal that teens get cigarettes from young adults as well as from other teens. Although young adults are a potential source of tobacco to minors,<sup>35, 36</sup> friends often share cigarettes with other friends in a reciprocal fashion. Some student entrepreneurs even exploit other students by selling them cigarettes at high prices.<sup>33</sup>

Forster, Chen, Blaine, Perry and Toomey (2003) examined the social exchange of cigarettes by Minnesota youth who had smoked a cigarette in the month prior to the survey and found that approximately 90% of current youth smokers obtained cigarettes from another teen and that

75% of teens supplied other teens with cigarettes. Teen daily smokers provided cigarettes to more teens and provided them more often than teens who smoked less than daily. Teen daily smokers also reported having more social sources (i.e., both teens and adults) than teens who smoked less often, and were more likely to have both bought cigarettes from and sold cigarettes to other teens.<sup>37</sup>

Much of the tobacco provided by minors to other minors is initially purchased from commercial sources by an adolescent donor.<sup>9, 38, 39</sup> Studies suggest that girls are less likely than boys to view cigarettes as affordable or easy to obtain, and self-report surveys found that adolescent girls were less likely than boys to report usually purchasing their own cigarettes.<sup>38, 40</sup> Additionally, young males are more likely than females to be approached by minors to acquire cigarettes.<sup>35, 36</sup>

## Smoking Dependence

### ***Youth become addicted to smoking for a variety of reasons including physical, social and personal reasons.***

It is increasingly recognized that adolescents who smoke are at risk of becoming dependent on tobacco.<sup>41, 42</sup> Once youth start smoking, many rapidly lose autonomy over the behaviour and may become tobacco dependent after smoking just a few cigarettes.<sup>43, 44</sup> A nationwide U.S. study found that boys who start smoking in adolescence continue to smoke for an average of 16 years and girls who begin smoking in adolescence continue to smoke for an average of 20 years.<sup>45</sup> Although youth who smoke demonstrate some of the characteristics of dependence observed in adults, there is still much to learn about how dependence develops, how it manifests, and how it is accurately measured in youth.<sup>46</sup>

Youth experiences with tobacco dependence are varied. Following smoking initiation, some youth experience physical symptoms rapidly,<sup>20, 47-49</sup> others have a slower onset,<sup>20</sup> and still others do not show any physical symptoms at all.<sup>20</sup> The evidence to date suggests that a substantial proportion of adolescent smokers can be classified as nicotine dependent,<sup>45</sup> with dependence rates ranging from 19% to 68%.<sup>50-52</sup> In fact, 43% of Canadian youth aged 15 to 19 years of age who currently smoke report smoking their first cigarette of the day within 30 minutes of waking.<sup>2</sup>

Tobacco dependence is sometimes characterized narrowly as physical dependence on nicotine. It is often referred to as nicotine dependence or addiction, and includes nicotine seeking behaviour and the avoidance of withdrawal symptoms. However, youth smoke for a variety of reasons and their dependence or need to smoke may not solely be based on an addiction to nicotine.<sup>48</sup> Results from a 2003 qualitative study found that although Canadian adolescents did not spontaneously use the term “dependence” in their discussions about needing cigarettes, the manner



in which they spoke about being “controlled by cigarettes,” “needing to smoke,” and “being addicted” to cigarettes revealed that their experience and understanding of dependence extended well beyond the need for nicotine. According to young people in this study, there are degrees of tobacco dependence and adolescents smoke varying amounts for different reasons: to meet social and emotional needs, for pleasure, or to feel empowered.<sup>46</sup>

## Factors Affecting Youth Smoking

The risk for smoking involves a complex interplay of physiological, social, and personal factors. Much research has gone into examining the factors that influence smoking initiation. Once youth begin experimenting with cigarettes, there are other factors that contribute to the ongoing use of the drug. The following section is an overview of the factors that relate to initiation and dependence. Theoretical explanations of findings are also offered.

**Physiological factors** include genetic make-up and predisposition to smoking uptake and maintenance, the relationship between physical activity and smoking, and smoking as a form of weight control.

### *Genetics*

There has been much research, mostly twin studies, signifying that there are genetic influences on smoking behaviour. In general, genetics plays a role in determining whether a person has a propensity or resistance to the initiation and maintenance of smoking; research studies commonly focus on the genetic predisposition to the addictive qualities of nicotine. However, genetics alone does not account for smoking initiation and maintenance; the interaction between genetics and environment is emphasized in the literature and this interaction is a predictor of smoking behaviour.<sup>11, 12, 53-56</sup>

### *Physical activity*

Research indicates that athletic youth, both males and females, are less likely to have smoked cigarettes regularly and that high levels of physical activity reduce the odds that smoking will begin or increase.<sup>57-60</sup> One possible explanation for these findings is that athletes may be more aware of the health consequences of cigarette smoking and perceive it as a serious threat to their health and ability to perform.<sup>57</sup> It should be noted that other studies have found an association between participation in sports and smokeless tobacco use.<sup>61-63</sup>

### *Weight control*

The notion that smoking suppresses weight may allow youth to justify smoking behaviour as a way to regulate weight.<sup>64</sup> Smoking to control weight is a dangerous and unhealthy practice, but youth may have unrealistic optimism about the trade-off. It has been suggested that this is more of a factor for girls than boys.<sup>65</sup>



## Social

The social environment of young people has an important connection to smoking.<sup>43</sup> Youth can take up smoking in response to social influences such as family, peers, media and advertising, and access and policy. These influences can be better understood by considering them in the light of various theories.

### *Parents and siblings*

Parents are a primary influence on their children's smoking behaviour. Parental smoking appears to influence whether their children try smoking. The 2004/2005 YSS found that over one-third (38%) of Alberta youth indicated at least one of their parents smoked.<sup>1</sup> In Alberta, 49% of students had tried smoking if at least one of their parents smoked versus 36% of students who had tried smoking if their parents did not smoke. Students with parents who did not smoke were more likely to report never smoking (64%) than were students who had at least one parent who smoked (51%). Results further show that, in Canada, about half (51%) of students whose parents smoked had tried smoking whereas 41% of students whose parents did not smoke had tried smoking. Conversely, 59% of students whose parents did not smoke had never tried smoking, whereas 49% of students whose parents smoked had never tried smoking.<sup>1</sup> International research confirms this trend: smoking at home facilitates youth initiation of cigarette use.<sup>66, 13</sup> Research finds that parents with a history of smoking are more likely to have children who experiment with cigarettes at a younger age,<sup>7, 67</sup> and youth with smoking parents are more likely than youth with non-smoking parents to have a peer group that smokes, which also facilitates youth smoking.<sup>68</sup>

Social learning theories can be helpful in understanding the relationship between parental smoking and youth smoking. According to Bandura's social cognitive theory,<sup>69</sup> observational learning is the fundamental cause of behaviour, including the behaviour of smoking. Youth observe and imitate behaviour modeled by those they hold close bonds with, such as family, particularly parents and siblings. Thus, the social cognitive theory posits that when family members (e.g., parents, older siblings) smoke, the risk that youth will imitate the smoking behaviour increases, whereas families that portray smoking as a negative behaviour reduce the risk that youth will smoke. Social learning theories have received support in the research literature, indicating that social modeling in the family is a strong predictor of smoking initiation.<sup>70, 71</sup>

Other explanations of how parental smoking increases offspring smoking are also useful. Not only do parents who smoke model the behaviour, but often they make the product available by leaving cigarettes around the house: both increase the likelihood of smoking initiation.<sup>7, 43, 72</sup> According to the TAYES 2005 results, access to cigarettes was easier for students with low and moderate levels of parental monitoring than for students with high levels of parental monitoring.

Parental monitoring is also related to youth smoking behaviour. TAYES 2005 results indicated that students with high levels of parental monitoring<sup>a</sup> were more likely to have never tried smoking cigarettes than students with moderate or low levels of parental monitoring and students with low or moderate levels of parental monitoring were more likely to try smoking than students with high levels of parental monitoring. Further, students with high levels of parental monitoring were more likely to report not smoking in the 30 days preceding the survey than students with moderate or low levels of parental monitoring.<sup>7</sup> Parents can reduce the risk of initiation and maintenance by providing good monitoring or good supervision.<sup>7, 67, 73</sup>

Siblings also play a major role in contributing to the initiation of youth smoking.<sup>14, 15, 74</sup> A 2005 U.S. study of smoking by siblings revealed that having a sibling who smoked increased the likelihood that other siblings would also smoke. To highlight the importance of social factors on smoking, this study controlled for genetic influences by comparing smoking rates between twins, full siblings, half siblings and unrelated siblings. Findings revealed that siblings who shared similar environments had similar levels of smoking behaviour.<sup>15</sup> Modeling, mere exposure to cigarettes, and peer pressure are possible explanations for these findings.

### *Peers*

Young people's decisions about tobacco use are highly influenced by the behaviour of their peers. Peers from school are often involved with onset of smoking and having peers who smoke increases the likelihood youth will smoke.<sup>14, 16</sup> Moreover, affiliation with peer groups that engage in high-risk behaviour predicts smoking initiation.<sup>75</sup> That is, for youth who smoked one or more times, having peers who used other tobacco products was highly associated with other tobacco use.<sup>44</sup>

The strength of the relationship with the peer group is essential when considering research findings related to youth smoking and peers. A 2003 Australian study of youth found that the peer influence was directly proportional to the strength of the bond between the individual and peer group; that is, as the relationship bond with the peer group increased so did the group's influence. Thus, if the peer group favours smoking and there exists a strong bond, then there is a greater likelihood that smoking behaviour will develop.<sup>76</sup> It is reported that the odds of being an "ever smoker" doubles with each additional close friend who smokes.<sup>15</sup> One of the strongest peer relationships is with a best friend. Accordingly, Johnson et al. (2002) found that the strongest factor influencing smoking in American eighth graders was having a best friend who smoked.<sup>43</sup>

### *Youth comments*

"I think in Grade 7...where you stand in the school is really important."<sup>28</sup>

"People don't really have to smoke, but they do it anyways to, like, fit in, or whatever. And they smoke to put out an image to people."<sup>46</sup>

<sup>a</sup> Parental monitoring was assessed based on students' responses to questions regarding their parents knowing where students are after school and at night, knowing who they are out with and setting a time when they must be home

### *School*

Smoke-free school policies can restrict the opportunities for youth to smoke. Not only are youth deterred by the punishment for violating policy, but the existence and enforcement of these policies promote norms against smoking as an acceptable behaviour for everyone, including teachers, who are important role models for adolescents.<sup>77</sup> Smoking on school property has been banned in most schools; however, this has not always been effective. For instance, Ontario legislation banned smoking on school property, but most school administrators did not perceive a decrease in student smoking, as youth would simply smoke just off school property.<sup>78</sup> Fortunately, many studies have found that combining school policy with school interventions and anti-smoking media campaigns successfully decreases the risk of initiation and progression of smoking.<sup>79-81</sup> Even simple school programs that practise ways to say “no” substantially reduce the odds of a youth becoming an “ever smoker.”<sup>15</sup>

The likelihood of smoking may be increased by dissociation from social institutions such as school. Research has shown that weak bonds with school or family predict smoking initiation and frequency of smoking.<sup>14, 82, 83</sup> These findings may be explained using social development theory, which contends that the influence of deviant peers can be countered by conventional societal bonds.<sup>84, 85</sup> Therefore, the influence of deviant peer behaviour such as smoking may be offset if youth have strong ties with traditional social institutions (e.g., school).

### *Media and advertising*

Media has a remarkable socializing effect on adolescent behaviour,<sup>86</sup> including youth smoking. Although smoking advertising is prohibited on television, there are numerous facets of media where smoking is not only permitted, but cast in a favourable light (e.g., prime-time programming, movies, music videos, and sporting events).<sup>87-101</sup> There has been much research, predominantly conducted in the U.S., that indicates that youth who view media and advertising that promote tobacco use tend to have higher smoking rates and more positive perceptions of smoking.<sup>102-109</sup>

A nationwide U.S. study comparing television viewing habits of youth showed that those who watched five or more hours of TV per day were six times more likely to initiate smoking than those who watched less than two hours per day.<sup>102</sup> Studies of youth viewing of movies and films yield similar results: the more movies and films youth watch, the more likely they are to smoke.<sup>95, 110</sup> The type of movies youth watch is also a factor. A 2002 study of over 4,500 New Hampshire and Vermont youth found that youth whose parents allowed them to watch R-rated movies, which contain more smoking, were 15 times more likely to smoke than youth who were not allowed to watch such movies.<sup>111</sup> It should be noted that these studies controlled for various demographic, social, and personality factors. It is also important to note that these relationships are associations and do not imply causation.



Tobacco advertising in stores is associated with an increased likelihood that youth will begin smoking; merely frequenting small grocery, convenience, or liquor stores on a weekly basis has been associated with an increased chance that youth will ever smoke.<sup>103</sup> In fact, a 2002 U.S. study exposed grade 8 and 9 students to either pictures of a store that was saturated with tobacco advertising or pictures of a store that had no such advertising. The results showed that, in comparison to the students exposed to pictures without tobacco advertising, the group of students who viewed the pictures of the store with tobacco advertising perceived easier access to cigarettes, believed more peers experimented with and approved of cigarettes, and showed less endorsement for tobacco-control policies.<sup>112</sup> Another study examined advertising for youth brands of cigarettes and revealed that a substantial proportion of 12- to 17-year-olds in Washington and Arizona, especially smokers, liked the ads for the youth brands and believed the ads made smoking more appealing.<sup>104</sup>

Media and advertising can also be used to inform youth and discourage them from smoking. Aggressive counter-marketing campaigns targeting youth have resulted in declines in cigarette use by American youth.<sup>113, 114</sup> In 2003, a review of empirical studies on the effect of anti-smoking advertising on prevention of youth initiation of smoking was conducted. The researchers revealed that anti-smoking advertising had positive preventive effects, especially for those in pre-adolescence or early adolescence.<sup>115</sup> Additionally, Hershey (2003, 2005) found that American youth and young adults aged 12 to 24 living in states with aggressive counter-industry media campaigns had more negative beliefs and attitudes towards the tobacco industry, which led to decreased smoking intentions and behaviour.<sup>116, 117</sup>

These findings may in part be explained using social cognitive theory,<sup>69</sup> which suggests that youth learn social behaviour by observing and imitating the behaviour modeled by others. Media forms that downplay the negative aspects of smoking and instead produce positive images of smoking portray smoking as a socially approved and enjoyable behaviour: the theory predicts that when youth view such media, the likelihood that they will smoke is increased. Conversely, the theory also predicts that youth observing media that discourages smoking or portrays it in a negative manner will be less likely to imitate the smoking behaviour.

#### *Access and policy*

Research shows that greater retail tobacco availability is associated with higher rates of smoking initiation and lifetime smoking by youth.<sup>13, 118</sup> Also, as mentioned earlier, accessibility in the home is an important factor. A 2002 U.S. study found that increased accessibility in the home for children in the fifth grade was a significant predictor for the onset of smoking by the eighth grade.<sup>43</sup>



Certain tobacco pricing policies can discourage youth from beginning to smoke.<sup>119, 120</sup> An increase in tobacco prices directly deters youth, particularly those with limited finances, from purchasing cigarettes from commercial sources.<sup>38, 121</sup> Increased pricing of cigarettes has a deterrent effect on youth smoking as well.<sup>122</sup> As mentioned, parents' smoking has a profound impact on their children's decisions about smoking. Higher cigarette prices may cause parents to stop smoking or purchase less appealing brands. As a result, youth have less access to cigarettes and are exposed to less parental modeling of the behaviour. Youth who do try their parents' cigarettes may be smoking a brand of lower quality and lesser appeal. The effect of increased pricing on peer smoking has the same consequences and peers may be less likely to share or give away their cigarettes because of the high cost of obtaining them.<sup>122</sup>

## Personal

Along with the physical and social influences, personal factors are associated with early smoking. These factors include age, beliefs, intentions, personality, and behaviour.

### *Age*

As youth get older, they are more likely to smoke. There are a number of reasons for this: For instance, youth find it easier to get cigarettes as they get older. TAYES (2005) revealed that getting cigarettes was significantly more difficult for students in junior high than for students in high school. Youth are also more likely to smoke as they get older because they are exposed to more risk factors that are related to smoking.<sup>7</sup> Also, children who initiate smoking at a younger age are at a greater risk for problem behaviour, including continued use of and eventual addiction to tobacco.<sup>3, 67, 116</sup>

### *Beliefs & perceptions*

It has been reported that youth underestimate the personal risks of smoking health.<sup>123</sup> Ellickson, Tucker and Klein (2001) suggest that the more often youth use cigarettes the more likely they are to hold beliefs that cigarettes are safe or beneficial.<sup>124</sup> Cognitive dissonance theory can be useful in understanding this trend.<sup>125</sup> The theory describes cognitive dissonance as an uncomfortable feeling experienced when one's behaviour is inconsistent with one's self-image. To resolve this discomfort, the theory posits, people usually alter their behaviour or alter their beliefs about the behaviour so the two are more closely aligned. In the context of smoking, for example, smoking youth who value their health and view themselves as reasonable at some point realize the negative health consequences and the unreasonable nature of smoking. Thus, they experience an uncomfortable feeling caused by the contradiction between the self-image of being a reasonable person and the unreasonable behaviour. To reduce this discomfort, youth may simply cease the behaviour. Youth who continue to smoke may convince themselves that the health risks of cigarettes are not as bad as they first thought, or that smoking is worthwhile because it relaxes them, or both.

These justifications help them to frame smoking as reasonable behaviour, thereby reducing the dissonance and discomfort. Ultimately, this belief alteration allows youth to uphold a reasonable self-concept and still smoke. Research findings have supported the application of cognitive dissonance theory to smoking.<sup>126</sup>

### *Intentions*

Differences in contemplating smoking can help account for differences in rates of starting smoking. In a 2004 study of 13- and 14-year-olds from England, adolescents who reported a greater intention to smoke and believed they could easily begin to smoke were much more likely to engage in the behaviour six months later.<sup>127</sup> Likewise, youths' intentions play a strong role in abstinence; namely, the intention not to smoke at a young age is associated with non-smoking behaviours at a later age.<sup>43, 73</sup> The theory of planned behaviour posits that intentions reflect a person's willingness and the effort they are willing to commit towards an action.<sup>127, 128</sup> Thus, the theory reasons that reported intentions are strong indicators of future behaviour.

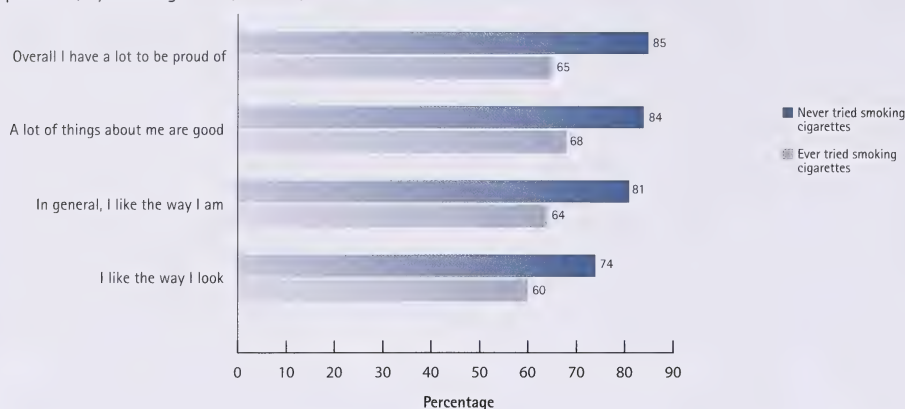
### *Personality*

Youth at risk for smoking are those who possess characteristics such as low self-esteem, depression, stress, high social-anxiety, rebelliousness, impulsivity, sensation seeking, aggression, and hyperactivity.<sup>129-136</sup> Conversely, youth who have high self-esteem, are socially confident, exhibit general social skills, are assertive and conscientious, possess better communication skills, and generally have greater personal strengths are less likely to engage in smoking.<sup>1, 7, 14, 137-140</sup>

The YSS (2004/2005) asked youth about their self-perception. The findings for Alberta indicated that youth who had never tried smoking had higher self-perception than youth who had tried smoking (see Figure 7). Nationally, results indicated that students who were never smokers felt better about themselves than students who were current smokers.<sup>1</sup>



Figure 7. Percentage of youth who responded "True" or "Mostly True" to self-perception questions, by smoking status, Alberta, 2004–2005



Source: Youth Smoking Survey (2004–2005)<sup>1</sup>

### *Behaviour*

Problem behaviour is more often associated with smokers than non-smokers. For instance, a 2001 U.S. study of 4,327 Grade 7 students and a follow-up study of these students in Grade 12 compared high-risk behaviour associated with early smoking. The results indicated that early experimenters and smokers were more likely than non-smokers to engage in various problem activities by Grade 12, with many of these types of behaviour evident as early as Grade 7.<sup>124</sup> Also associated with smoking were misbehaviour and rule-breaking in school, younger age at first intercourse, lower levels of responsibility, and hostility.<sup>132–144</sup> Further research converges on such findings: high school students who had dropped out, had experienced poor academic achievement, and had not planned on attending college were more often smokers than students with greater academic aspirations.<sup>141, 145, 146</sup> Problem behaviour theory posits that one type of behaviour influences other types of behaviour.<sup>147–149</sup> Thus, engaging in some types of problem behaviour will facilitate engagement in other types of problem behaviour. The greater a youth's involvement in problem behaviour such as delinquency, irresponsible actions, and academic failure, the greater the odds that other problem behaviour will occur, including smoking. Research validates the predictions of problem behaviour theory, and supports the concept of discouraging one kind of problem behaviour to reduce other problem behaviour.<sup>150</sup>

## Outcomes of Youth Smoking

### *Smoking outcomes have a pronounced effect on youth*

Youth underestimate the risks and have unrealistic optimism regarding their susceptibility to the outcomes of smoking.<sup>21–23, 29</sup> Youth also believe they can quit before any damage is done.<sup>151</sup> In reality, adolescents who begin smoking early are actually at higher risk of the consequences of smoking

and find it more difficult to quit than people who start later in life.<sup>20, 35, 152</sup> In fact, research suggests that in comparison to adults, nicotine may have more of an effect on youth and youth are more likely to be diagnosed as nicotine dependent.<sup>20, 153</sup>

The health consequences of smoking are a function of both the length of time and amount smoked, and according to the 1994 U.S. surgeon general report, adolescents who are regular smokers are at an increased risk for health problems during their adolescent and young adult years.<sup>38</sup> Cigarette smoking during adolescence reduces the rate of lung growth, maximum lung function, and overall fitness level; as well, it increases heart rate, blood pressure, and the risk of respiratory problems and infections.<sup>17-20</sup>

(Refer to the chapter “Health Consequences of Tobacco Use” for more information on the health effects of the use of tobacco products.)

#### Youth comments

“It’s not worth losing everything in life because of a stupid habit.”<sup>28</sup>

“No one really wants to be hanging out with people who are poisoning themselves and everyone around them. They don’t want to hang out with people that are making themselves look bad.”<sup>28</sup>

## Smoking Reduction

***Tobacco control programs aimed at youth at a variety of societal levels are needed to discourage youth from starting smoking and encourage smokers to quit.***

Many adolescents want to quit or reduce their smoking but frequently report difficulty in doing so.<sup>20, 24, 25</sup> Youth who try to quit usually run into difficulties in dealing with withdrawal symptoms.<sup>154, 155</sup> Quitting can be very frustrating and demanding, especially for youth, who often indicate that they are unable to refrain from smoking despite their best intentions.<sup>155, 156</sup>

Very few adolescent smokers cease or decrease their behaviour without some form of intervention. The spontaneous or unassisted quit rates of adolescents are unexpectedly low, primarily because of the assumption that adolescents “mature out” of smoking or easily quit on their own.<sup>20, 155, 157-160</sup> Youth may need help to quit or reduce the amount they smoke. To improve cessation and reduction rates in youth and prevent the problem all together, it is useful to examine what can be done at different levels of society. This section, informed by the influences discussed earlier in this chapter, explores the ways different elements of society can contribute to the prevention, cessation, and reduction of smoking by youth.

### *Federal and provincial legislation*

Although it is against the law across Canada to sell cigarettes to minors, only some provinces make it illegal for minors to possess cigarettes: Alberta is one of those provinces. In Alberta, youth under the age of 18 who are in possession of, or using, tobacco in a public place may be fined \$100 and have the product confiscated.<sup>10</sup>



### *Taxation*

Taxing tobacco is a strategy that works especially well with young smokers and potential smokers, who are very sensitive to the price of cigarettes.<sup>38, 119, 121</sup> According to a 2005 public awareness campaign, 76% of youth supported increases in tobacco taxes. Never smokers are more supportive of this than current smokers.<sup>30</sup>

### *Restrict access*

As the research shows, many youth find it easy to get cigarettes. Identifying sources of tobacco and methods of obtaining tobacco products can assist efforts aimed at reducing youth access to tobacco products.<sup>31-33</sup>

### *School policy*

Enforcing school tobacco policies can reduce smoking.<sup>44</sup> Implementing a smoke-free policy for students, staff, and visitors on all school property and school events can reduce youth smoking and is even more effective when accompanied by prevention and cessation education.<sup>161</sup>

Creating policy can be a challenging task, and there are established guidelines for doing so. The Alberta Tobacco Reduction Strategy has outlined 10 steps for creating an effective school tobacco policy.<sup>162</sup>

1. Bring people together.
2. Clarify the purpose and principles of the policy.
3. Ensure that prevention resources and strategies are in place.
4. Support student and staff efforts to quit.
5. Agree on the content of the policy.
6. Write the policy in clear, easy-to-understand language.
7. Develop and implement a communication strategy.
8. Implement the policy.
9. Evaluate the policy.
10. Celebrate the tobacco-free school policy.

### *Programs*

Youth programs and interventions can be extremely useful in helping youth avoid and reduce smoking; however, the literature offers many suggestions for improvement. Youth programs and interventions are often criticized for focusing too much on prevention and neglecting cessation.<sup>163</sup> Cessation programs have been faulted because they are often adapted from adult cessation programs and are not sensitive to the cessation needs of youth,<sup>163</sup> they assume adolescents are not interested in cessation, they assume youth are unlikely to be dependent on nicotine, and they often have little success in recruiting and retaining youth.<sup>44, 121, 154, 164-170</sup> New research has aimed to resolve such misperceptions, and current programs often reflect a greater understanding of the need for cessation programs tailored to current adolescent smokers.

### Youth comments

"If you are allowed to smoke around people, it is eventually, over time, murdering someone. You (smokers) should be fined." <sup>28</sup>

Effective cessation and reduction programs should also consider the physical, social, and personal issues involved in youth smoking. Below is a list of evidence-based guidelines for successful youth tobacco programs.<sup>26</sup>

- Involve stakeholders.
- Explain your purpose and goals.
- Connect with broader tobacco reduction goals.
- Give youth good reasons to join.
- Keep a record of recruitment methods.
- Don't forget promotion.
- Focus on building youth social and personal skills.
- Use multiple strategies.
- Encourage family and community involvement (to counteract authority figure stigma) and may also include youth advocating anti-smoking campaigns in the community.
- Include media awareness.
- Use role-playing.
- Reach beyond schools.
- Make programs interactive.
- Avoid scare tactics.
- Base programs on theory.
- Use peer influence.
- Ensure programs are delivered by properly trained staff.
- Use role models.
- Work across subject areas in school (i.e., in Science class identify the chemicals found in cigarettes).

Additional guidelines include keeping youth busy with other activities<sup>28</sup> providing nicotine replacement therapy where addiction is present, not accepting funding from tobacco companies,<sup>171</sup> beginning programs early,<sup>172-174</sup> and evaluating program effectiveness.

AADAC's youth tobacco reduction programs are part of AADAC's overall range of services for youth. Following many of the guidelines above, AADAC and its partners implemented four provincial youth tobacco programs in 2002.<sup>27</sup>

Table 1. Tobacco reduction programs for youth in Alberta

Program	Target	Strategy focus
Teaming Up for Tobacco-Free Kids	Grades 4, 5 and 6	Prevention
Building Leadership for Action in Schools Today (BLAST)	Grades 7, 8 and 9	Prevention, protection and cessation
Youth Action and Advisory Project (YAAP)	Youth aged 14–17	Prevention, protection and cessation
Kick the Nic	Youth aged 14–18	Cessation and protection

In addition to these guidelines, there are several useful models and techniques that have shown to be useful in the design of formal cessation programs. The transtheoretical model of change (also known as “stages of change”) has been used for over a decade to help understand and predict the behaviour of those trying to quit. This model states that there are different stages in the smoking cessation process knowing a person’s stage of change allows one to better understand and predict his or her behaviour.<sup>175, 176, 177, 178</sup> Sensitivity to the mindset of the person quitting enhances program design and action.

Other useful techniques include motivational interviewing and motivational enhancement therapy, which are self-empowering youth cessation programs. Motivational interviewing is designed to encourage youth to consider, initiate, and maintain precise strategies in order to reduce harmful behaviour.<sup>179</sup>  
<sup>180</sup> Motivational interviewing, like motivational enhancement therapy, comprises brief, non-confrontational counselling sessions which attempt to get a person to consider the effects of substance abuse and options for change.

### *Appropriate Advertising and Marketing*

Much has been reported on successful media campaigns.<sup>115-117, 181, 182</sup> Media that denounce smoking, inform youth about the dangers of smoking, and conduct large, well-designed media campaigns that counter marketing by the tobacco industry will aid in the reduction of tobacco use.<sup>67-70</sup> Additionally, limiting tobacco advertising in public and commercial venues will also reduce youth smoking. Policy should be developed and enforced to control the influence tobacco advertisers have on youth, especially underaged youth. Media can also be used to raise awareness about youth anti-smoking programs.<sup>20</sup>

### *Family and friends*

Family or peers can reduce tobacco use by modeling behaviour that frames tobacco use as socially undesirable. Family can also reduce the risk of initiation and maintenance by implementing good parental monitoring skills,<sup>7</sup> providing good parental supervision<sup>73</sup> and educating their children about cigarette use. The risk that youth will smoke is further reduced if youth have peer groups who do not smoke and have strong ties to conventional institutions which serve to shield youth from the influence of deviant peer groups.<sup>84, 85</sup>

(Refer to the chapters “Cessation of Tobacco Use” and “Tobacco Addiction” for more information.)

Youth comments on the Barb Tarbox anti-smoking commercials<sup>28</sup>

*“It made you want to know more about what else could happen.”*

*“I thought it was really good at warning you about the risks.”*

## Youth comments

*"I had a couple of friends that used to smoke... all of us were disgusted. We would walk away until they were done. We wouldn't want to get poisoned from them smoking."*

As illustrated in Table 2, the AADAC Evaluation of the 2005 Alberta Tobacco Reduction Strategy gauged the percentage of youth (aged 12 to 17) who fully supported the following possible ways to prevent young people from smoking.<sup>30</sup>

Table 2. Youth support for prevention strategies

Prevention strategy	% Fully support
Education in schools on the harmful effects of tobacco and smoking	72
Banning smoking in public places where youth under age 18 are allowed	79
Increasing tobacco taxes	76
Banning the public display of cigarettes in retail stores	64
Tougher penalties for people who sell or give cigarettes to youth under age 18	80

Source: Evaluation of the Alberta Tobacco Reduction Strategy public awareness campaign 2005 report (2005)<sup>30</sup>



## Summary

National and provincial rates of smoking experimentation and maintenance have declined since 1994. Canadian and Albertan youth who smoke or try smoking typically do so by the age of 14 and many have tried by the age of 11.

Youth obtain cigarettes from commercial and social sources. As youth get older, they are more likely to get cigarettes from commercial sources.

Although youth are taught about smoking in school, they still have misperceptions about smoking behaviour.

Youth become addicted to smoking for a variety of reasons, including physical, social and personal reasons. For instance youth may take up smoking in response to social influences such as family, peers, and media and advertising. Youth smoking rates are also influenced by ease of access to tobacco and by social policy. Along with the physical and social influences, personal factors also are associated with early smoking. These factors include age, beliefs, intentions, personality, and behaviour.

Tobacco control programs that affect youth at various societal levels are needed to discourage youth from starting smoking and encourage smokers to quit.

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# PREGNANCY AND SMOKING

## Quick Facts

- According to Alberta Health and Wellness, 19% of women smoked during their pregnancy in 2004.<sup>1</sup>
- According to the 2006 Canadian Tobacco Use Monitoring Survey, of women in Alberta who smoked, 45%<sup>†</sup> continued to smoke during their pregnancy every day or almost every day.<sup>2</sup>
- Women who smoke during their pregnancy are more likely to deliver a low-birth-weight baby.<sup>3-5</sup>
- Low-birth-weight babies are at an increased risk of suffering severe health problems and neonatal (newborn) death.
- Maternal smoking increases the risks of miscarriage, stillbirth and death of the newborn within the first few weeks of life.<sup>6-10</sup>
- In Alberta, sudden infant death syndrome (SIDS) is 1.4 to 4.4 times more common among babies whose mothers smoked during pregnancy.<sup>11</sup>
- Exposure to second-hand smoke after birth is associated with increased incidence of SIDS.<sup>12</sup>
- Growing evidence suggests that maternal smoking during pregnancy may be associated with deficits in intellectual ability, behavioural problems, and physical malformations in children.<sup>13-18</sup>

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

- Though quitting smoking before a pregnancy is most beneficial to the fetus, stopping or reducing smoking during pregnancy will still have positive effects on fetus growth.<sup>19-23</sup>
- A substantial proportion of women (50% to 75%) who quit smoking during pregnancy resume smoking within six months postpartum.<sup>24-28</sup>

## PREGNANCY AND SMOKING

Smoking increases health risks for pregnant women and their unborn babies. Among women who smoke, the risks associated with tobacco use include reduced fertility and miscarriage. The risks to the fetus include preterm birth, low birth weight, mortality, stillbirth and sudden infant death syndrome. Consequently, smoking during pregnancy is an important public health issue. Cessation of smoking before or during pregnancy helps to reduce the occurrence of these health risks.

### Prevalence of Smoking During Pregnancy in Alberta

A 2006 Alberta Health and Wellness report entitled *Alberta Reproductive Health: Pregnancies and Births* examined maternal risk factors in relation to birth outcomes, including the use of tobacco by pregnant women in Alberta between 1997 and 2004. The report showed that 19% of Alberta women who gave birth to a live infant in 2004 smoked at some point during pregnancy, although some of these women may have quit smoking during their pregnancy.<sup>29</sup> Between 1997 and 2004, the use of cigarettes during pregnancy in Alberta decreased from 27% to 19% (see Figure 1).<sup>29</sup>

The 2006 Canadian Tobacco Use Monitoring Survey results indicated that among women in Alberta who were pregnant within five years before the survey and who had smoked during pregnancy, 45%<sup>†</sup> reported that they smoked during their pregnancy every day or almost every day. This finding was higher than what was found nationally; only 32% of Canadians who were pregnant within five years before the survey and who had smoked reporting smoking every day or almost every day during their pregnancy.<sup>2</sup>

Figure 1. Rate of smoking during pregnancy in Alberta, 1997 to 2004



Source: Alberta Reproductive Health, *Pregnancies and Births* Report (2006)<sup>1</sup>

Though the trend of smoking during pregnancy is clearly decreasing, it has been suggested that a decrease in smoking during pregnancy is due to lower rates of smoking initiation among women of childbearing age rather than an increase in the cessation rates of pregnant women.<sup>30</sup>

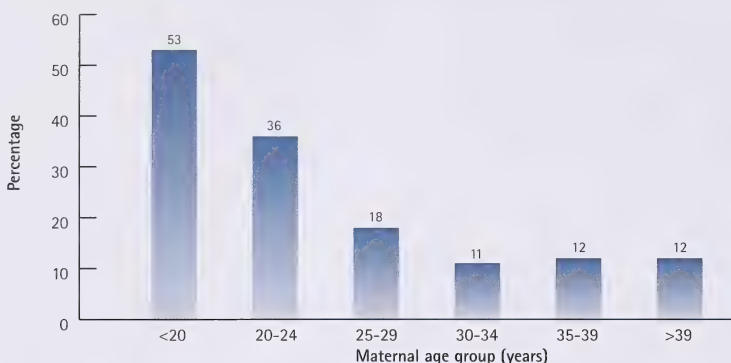
Smoking during pregnancy is more common among younger Alberta mothers.<sup>11, 29</sup> For the combined years of 2002 to 2004, the use of tobacco during pregnancy was reported by 53% of pregnant women under the age of 20 compared with approximately 12% of pregnant women aged 30 and older (see Figure 2). In Alberta, for 2002 to 2004 combined,

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.



the average maternal age for women who smoked during pregnancy was 26 years and the average maternal age for non-smokers was 30 years.<sup>29</sup>

Figure 2. Rate of smoking during pregnancy by maternal age group, Alberta, 2002 to 2004 combined



Source: Alberta Reproductive Health, Pregnancies and Births Report (2006)<sup>1</sup>

Ethnicity may also play a role in maternal smoking. From 1999 through 2003, First Nations women in Alberta who gave birth in an Alberta hospital had a rate of smoking during pregnancy that was three times higher than non-First Nations women. For instance, in 2003, 54% of First Nations women smoked during pregnancy, whereas 19% of non-First Nations women smoked during pregnancy.<sup>29</sup>

When examined by regional health authorities (RHA) in Alberta, for 2002 to 2004 combined, smoking during pregnancy ranged from 14% in the Calgary Health Region to 34% in the Aspen Health Region. Rates for RHAs are shown in Table 1.

Table 1. Smoking during pregnancy in Alberta by regional health authority, 2002 to 2004 combined

RHA	Percentage of pregnant smokers
Calgary	14%
Chinook	19%
Capital	20%
East Central	24%
Palliser	27%
Northern Lights	28%
Peace Country	31%
David Thompson	31
Aspen	34%
Alberta	20%

Source: Alberta Reproductive Health, Pregnancies and Births Report (2006)<sup>1</sup>

#### TOXINS THAT PASS THROUGH THE PLACENTA

##### *Nicotine*

Scientists have found that nicotine levels in the fetuses of mothers who smoke are actually higher than those found in the mother.<sup>3</sup> Nicotine is also passed on to babies through the breast milk of smoking mothers.<sup>3</sup>

##### *Carbon monoxide*

Carbon monoxide attaches more readily to fetal hemoglobin than to adult hemoglobin and interferes with oxygen delivery.<sup>3</sup>

##### *Carcinogenic chemicals*

Scientists have not yet found a definite link between maternal smoking and childhood cancer or cancer occurring later in adulthood. However, they have discovered that carcinogens (cancer-causing substances) such as benzopyrene, aminobiphenyl and acrylonitrile cross the placenta. The fetus of a smoking mother can have levels of these chemicals that are 10 to 20 times higher than the fetus of a non-smoker, and the fetus of a mother who is exposed to SHS can have levels that are four to five times higher than the fetus of a mother who is not exposed to SHS.<sup>34</sup>

## Health Consequences of Smoking During Pregnancy

### ***The toxic chemicals in tobacco pass through the placenta to the fetus.***

Nicotine, carbon monoxide and carcinogens (cancer-causing chemicals) are all found at increased levels in the fetuses of smoking mothers and in non-smoking mothers who are exposed to second-hand smoke (SHS).<sup>3, 31</sup> Because the harmful compounds in tobacco pass through the placenta, maternal smoking (or maternal use of spit tobacco) creates serious health problems for infants both before and after birth, and can even result in death.<sup>32</sup> Women who smoke are more likely to suffer placental abnormalities and a low-lying placenta (placenta previa).<sup>33</sup>

Different patterns of timing (when smoking occurs during the pregnancy), duration (how long smoking occurs), and intensity (the amount smoked) of fetal exposure to toxic chemicals in cigarettes result in differences in the effect of smoking on fetal health.<sup>19-21</sup> A dose-response relationship has been observed (that is, higher levels of tobacco use are associated with higher levels of risk). Reducing smoking during pregnancy is therefore beneficial, but no amount of smoking during pregnancy is risk-free.<sup>3</sup>

### **Preterm delivery and low birth weight**

Two factors that significantly affect birth weight are the gestational age of the fetus at the time of delivery (whether the baby is preterm or full-term) and the growth rate up until delivery. Nicotine has been shown to affect both of these factors, often resulting in low-birth-weight babies (less than 2,500 grams or five pounds, eight ounces).<sup>3, 9, 10</sup>

Smoking during pregnancy increases the risk of preterm birth.<sup>1, 5, 20, 35</sup> The preterm birth rate for smokers in Alberta from 2002 through 2004 was 10.9 per 100 live births, while the rate was 8.5 for non-smokers.<sup>1</sup> On average, gestational age at delivery is three to five days shorter for babies with smoking mothers than for those born to non-smokers.<sup>36</sup> Many preterm infants have low birth weight.<sup>1</sup>

### ***Babies born to smokers weigh less than babies born to non-smokers.***

#### ***Low birth weight can result in severe health problems and neonatal death.***

Cigarette smoking during pregnancy can cause growth restriction and low birth weight in infants.<sup>4, 37</sup> According to the 2001 U.S. surgeon general's *Report on Women and Smoking*, a pregnant woman who smokes was 1.5 to 3.5 times more likely than a non-smoker to have a low-birth-weight baby.<sup>5</sup> The average birth weight for babies in Alberta born to smokers between 2002 and 2004 was 3,259 grams, compared with 3,397 grams for babies born to non-smokers, a difference of 138 grams. The low-birth-weight rate for smokers in Alberta was 9.0 (per 100 live births); the rate for non-smokers was 5.9.<sup>1</sup> An estimated 11% to 21% of all low-weight births are associated with exposure to tobacco products.<sup>38</sup> Though all smokers are at increased risk for having a low-birth-weight baby, this risk is pronounced among mothers over the age of 30.<sup>1</sup>

Low-birth-weight babies are also at greater risk for respiratory illnesses related to second-hand smoke than are newborns of normal birth weight.<sup>45</sup>

Recent findings show that maternal smoking is not the only problem. Non-smoking mothers who are consistently exposed to SHS are also at increased risk for having low-birth-weight babies.<sup>39-41</sup> Low-birth-weight babies are at increased risk for various negative health consequences, including mortality, morbidity, and cognitive impairments.<sup>1, 42-44</sup>

## Mortality

### ***Smoking during pregnancy has a significant impact on childhood mortality.***<sup>1, 40</sup>

A 2001 study showed that infants whose mothers smoked during pregnancy suffered a mortality rate that was almost double the rate of infant mortality found in children of mothers who did not smoke during pregnancy.<sup>49</sup> The authors estimated that in a population in which 30% of pregnant women smoke, approximately 20% of all infant deaths could be prevented if women who smoked during pregnancy ceased by the sixteenth week of gestation.<sup>49</sup>

## Miscarriage and fertility

### ***Maternal smoking increases the risk of miscarriage and can cause a reduction in fertility.***

Studies have consistently confirmed the association between smoking and miscarriages for more than 20 years. The risk of miscarriage in the first 20 weeks of pregnancy is higher for smokers than for non-smokers.<sup>6</sup> A pregnant woman who smokes is 1.6 times more likely than a non-smoker to have a miscarriage.<sup>7</sup> Smokers may also have a more difficult time getting pregnant because smoking reduces a woman's fertility.<sup>3, 46</sup> The effects of smoking on both miscarriage and fertility are dose dependent and, ultimately, reversible: former smokers do not have higher miscarriage rates or lower fertility rates.<sup>3, 6</sup>

## Stillbirth

### ***Maternal smoking increases the risk of stillbirth.***

The risk of stillbirth and death within the first few weeks of life is higher in babies of smokers. The risk is partly due to the increased risk of preterm birth and low birth weight. Both of these factors are associated with neonatal death.<sup>8, 49</sup>

## Sudden infant death syndrome (SIDS)

### ***Maternal smoking is a cause of SIDS.***<sup>50</sup>

Substantial literature exists on the relationship between smoking and SIDS.<sup>11</sup> SIDS is the most common cause of death in babies between the first month and first year of life.<sup>51</sup> It is estimated that more than one-third of all SIDS deaths are due to maternal tobacco use.<sup>6</sup> A 2003 U.S. study that analyzed over 120,000 hospital records showed that infants of mothers who smoked during pregnancy were 2.5 times more likely to die from

Male fertility may be affected by smoking. Studies have suggested that smoking can reduce sperm quality.<sup>21, 46, 47, 48</sup> More research in this area is needed before strong conclusions can be made about the details of smoking and male fertility.

The U.S. surgeon general concludes that women who smoke<sup>5, 46</sup>

- more often have delayed conception
- increase their risk of infertility
- increase the risk of ectopic pregnancy (implantation of an egg outside the uterus)
- increase the risk of spontaneous abortion
- increase the risk of preterm premature rupture of membranes, placental abruption and placenta previa (placenta obstructs opening of the cervix)
- increase the risk of preterm delivery
- are less likely to breastfeed
- increase the risk of sudden infant death syndrome
- have babies that weigh less
- have babies who are small for gestational age

A 2001 study showed that exposure to tobacco smoke increased the risk of stillbirth. The authors estimated that in a population in which 30% of pregnant women smoke, approximately 25% of stillbirths could be prevented if pregnant women who smoked ceased by the sixteenth week of gestation.<sup>49</sup>



Maternal smoking is also associated with childhood problems, such as reduced lung function, increased risk of respiratory illness in early infancy,<sup>52</sup> and middle ear disease in childhood.<sup>53</sup>

SIDS than infants of mothers who did not smoke during pregnancy.<sup>9</sup> Exposure to SHS after birth is also associated with increased incidence of SIDS.<sup>12</sup>

## Developmental and Behavioural Problems and Maternal Smoking

***Growing evidence suggests that maternal smoking during pregnancy is associated with deficits in intellectual ability and behavioural problems in children.***

Maternal smoking during pregnancy has been associated with a variety of behavioural and neurodevelopmental problems in children. These include reduced general intellectual ability, problems with language and auditory tasks, lower academic achievement, and behavioural problems such as hyperactivity and decreased attention span.<sup>13-15</sup>

Specific tobacco-related symptoms emerging from recent research suggests maternal smoking increases the risk of<sup>13-18, 54-57</sup>

- lower school performance
- anxiety
- reduced cognitive abilities
- externalizing behavioural problems
- reduced fine motor skills
- conduct disorder (older children)
- disruptive behaviour
- substance abuse (older children)
- depression

A 2005 study, which controlled for factors such as socioeconomic status, family history of psychiatric hospitalizations, conduct disorders and comorbidity, found that women who smoked during pregnancy were three times more likely to have children who suffered from hyperkinetic disorder. Hyperkinetic disorder is more commonly known as attention deficit/hyperactivity disorder or ADHD.<sup>57</sup>

It is difficult to establish definitive causal relationships in an area as complex as behavioural and neurodevelopmental problems; however, this relatively new area of study is receiving attention. As research continues in the area of smoking and reproductive health, there will be a greater understanding of the full range of effects that smoking might have on the fetus and child. The known problems associated with smoking during pregnancy are severe enough to make this a very important area of focus for tobacco reduction.

## Quitting and Pregnancy

Studies examining the effects of stopping or reducing smoking during pregnancy on perinatal outcomes have shown that quitting smoking protects fetal growth.<sup>19-21</sup> The benefits of smoking cessation during pregnancy are substantial.<sup>22, 23</sup> It has been found that infants of women who quit smoking by the first trimester have weight and body measurements comparable with those among infants of non-smokers.<sup>5</sup> Even when women quit smoking in their third trimester, their babies have higher birth weights than the

A U.S. study published in 2005 showed that among children, SHS exposure was related to cognitive deficits. Specifically, children exposed to higher levels of SHS were found to have greater deficits in math, reading, and visuospatial reasoning than children exposed to lower levels of SHS.<sup>55</sup>



babies of mothers who do not quit.<sup>22</sup> However, these newborns still lag behind those whose mothers did not smoke at all during pregnancy.<sup>11</sup>

Pregnant women who smoke are increasingly aware that smoking may be harmful to their offspring and are under social pressure to quit. Many women stop smoking upon learning they are pregnant. Studies have shown that 13% to 40% of female smokers quit when planning to become pregnant or upon finding out they are pregnant.<sup>24, 28, 58-61</sup> The majority of women who stop smoking do so in the first trimester;<sup>62</sup> an additional 2% to 22% may quit later in their pregnancy.<sup>24, 28</sup> Those who do not quit for the duration of their pregnancy may quit, reduce, and relapse multiple times during pregnancy, balancing their desire to promote the health of their infant against nicotine dependence, stress, and other pressures that induce smoking.<sup>63</sup> Among those who do not quit, many reduce the number of cigarettes they smoke.<sup>24, 28</sup>

### Factors associated with smoking cessation or persistence during pregnancy

There are differences between women who smoke during their pregnancy and those who do not. Knowing the social determinants of health and the psychological and behavioural barriers preventing cessation among pregnant women who smoke can be beneficial in developing appropriate and effective smoking cessation approaches.

Women who smoke during pregnancy are more likely to quit if <sup>64, 65</sup>

- it is their first pregnancy
- they are younger
- they smoke less
- they have more social support
- their partners do not smoke

Women who smoke during pregnancy are more likely to continue smoking if <sup>27, 64, 66-90</sup>

- they are heavily addicted to nicotine
- they have high levels of stress
- they are single parents
- they are exposed to SHS at home or at work
- they have lower levels of education
- they have a lower income
- they suffer from depression, job strain or workload
- they have low levels of cessation support
- they have concerns about weight gain
- they started smoking at an early age

The PRAMS study (Pregnancy Risk Assessment Monitoring System) of the Centers for Disease Control (CDC), described smoking before, during and after pregnancy in 10 U.S. states between 1993 and 1999. The study showed that just over 40% of women quit smoking between the period three months before pregnancy and three months before delivery, but almost 60% of quitters resumed smoking within six months postpartum.<sup>27</sup>

A 2003 study identified specific factors associated with smoking status and pregnancy. The findings suggested that pregnant women who are unable to quit smoking during pregnancy exhibited difficulty in modulating their behaviour in many other aspects of their lives. Women who smoked during pregnancy were more likely than both women who quit smoking during pregnancy and pregnant women who were non-smokers to have problematic relationships, to have poorer adaptive functioning and to be engaged in

problematic health behaviour. The following factors were found to be associated with increased rates of smoking during pregnancy:<sup>78</sup>

*Interpersonal factors*, such as

- adolescent history of running away from home
- history of initiating fights as a teen
- aggressive interactions in adulthood
- poor relationships with partners
- repeated lying as a teen
- having children with multiple partners
- co-residing with multiple men in non-marital relationships
- low marital adjustment
- irritable, aggressive interpersonal relationships

*Adaptive factors*, such as

- adolescent history of dropping out of high school
- frequent truancy
- thievery as an adolescent
- stressful or difficult life circumstances
- lack of community life skills
- a history of arrest

*Health factors*, such as

- late entry into prenatal care
- little use of preventive health care
- irregular use of prenatal vitamins
- teenage first birth
- substance abuse

Smoking during pregnancy is often not an isolated health-compromising behaviour that mothers engage in; rather, it is often part of a long-standing pattern of behaviour across interpersonal, adaptive, and health domains.<sup>75</sup> Therefore, examining pregnant smoking as part of a broader matrix of problem behaviour may help to identify pregnant women most at risk for persistent smoking and to inform the development of targeted interventions.

### ***Postpartum relapse***

For those women who quit during their pregnancy (also known as “spontaneous pregnancy quitters”), smoking cessation appears to reflect a deliberate effort to protect the baby, rather than a long-term intention to quit. That is, they seem to have “suspended” their smoking rather than actually quit.<sup>24, 28</sup> As a result, postpartum relapse is high: between 50% and 75% of those who quit during pregnancy relapse to smoking within six months postpartum, and 70% to 90% by one year postpartum.<sup>25, 26, 28</sup> Further relapse can occur up to three years after delivery.<sup>91</sup>

When women enter the postpartum period, they may be unprepared to maintain their smoking cessation. After six months postpartum, women continue to experience significant changes in their lives as they return to work, begin to socialize more frequently, provide child care for increasingly active infants, wean from breastfeeding, and resume or expand the management of multiple roles.<sup>92, 93</sup> All of these transitions present new risks.

For some women, stopping smoking is relatively easy in the context of pregnancy. Relapse rates may be relatively high postpartum because it is not until after delivery that women start truly engaging in the experiential and behavioural processes associated with the action phase of smoking cessation (see the chapter Cessation of Tobacco Use for a description of the stages of change).<sup>94</sup> Other factors associated with postpartum smoking relapse include depression, having a partner who smokes, minimal support for cessation efforts, dissatisfaction with weight, the amount smoked before pregnancy, early weaning of breastfeeding, and drinking coffee or alcohol.<sup>25, 95</sup>

## **Cessation Approaches for Pregnant Women**

Lumley, Oliver and Waters (2002) conducted a systematic review of smoking cessation during pregnancy.<sup>96</sup> It was recommended that smoking cessation programs need to be implemented in all maternity care settings, because these programs have been shown to increase smoking cessation, increase the mean birth weight, and reduce low birth weight among newborns. A key factor in reducing smoking during pregnancy is the role of the health-care providers who care for pregnant women. They are in an optimal position to identify and intervene with pregnant women who smoke.<sup>97</sup> Research shows that tobacco treatment interventions by health-care providers can increase the number of patients who successfully quit.<sup>96</sup>

Research has also found that cognitive behavioural intervention strategies are effective in smoking cessation.<sup>96</sup>

The U.S. Public Health Service (PHS) Clinical Practice Guideline, developed in 2000, provides recommendations and guidelines to assist health-care providers to integrate a tobacco treatment intervention into an office setting. These clinical practice recommendations are based on a review of 3,000 articles in the research literature and dozens of meta-analyses.<sup>98, 99</sup> The PHS Clinical Practice Guidelines recommend that all patients, including pregnant women, should be asked about tobacco use and should have their tobacco-use status documented on a regular basis.<sup>98</sup> Specifically, these guidelines recommend that health-care providers 1) ask all patients about their tobacco use, 2) advise patients to stop using tobacco, 3) assess their willingness or motivation to quit, 4) assist patients interested in cessation efforts, and 5) arrange appropriate follow-up.<sup>98, 99</sup> This is known as the “5 A’s” approach. There are other best practice guidelines targeted at smoking cessation of pregnant and postpartum women, one of which is a 2003 guide developed in Canada titled *Expecting to Quit: A Best Practices Review of Smoking Cessation Interventions for Pregnant and Postpartum Girls and Women*.<sup>100</sup>

Public health efforts have targeted pregnant women who are responsive to relatively brief, prenatal cessation interventions; yet the heaviest smokers, whose fetuses are at greatest risk, are the least responsive to such interventions.<sup>101, 102</sup> Thus, it is important for clinicians to assess the level of addiction before providing cessation aid. Health-care providers may turn to assessment instruments designed to assess the smoking behaviour of pregnant women (for more on instruments used to assess smoking among pregnant women, refer to the manual *Maternal Substance Use Assessment Methods Reference Manual: A Review of Screening and Clinical Assessment Instruments for Examining Maternal Use of Alcohol, Tobacco, and Other Drugs*<sup>103</sup>). Understanding patterns of cessation, reduction, and relapse over the course of pregnancy is vital to developing targeted interventions for pregnant women for whom standard interventions are not successful.<sup>63</sup>

## Summary

Research has shown that women who smoke are more likely to have problems becoming pregnant and that pregnant women who smoke experience higher rates of miscarriage, stillbirth, and pregnancy complications than non-smoking pregnant women. Children who are born to mothers who smoke weigh less at birth than children born to non-smoking mothers and are more likely to be born preterm. These children are also at greater risk for sudden infant death syndrome and tend to have more childhood difficulties than do children born to non-smoking mothers.

Although many women are aware of the harmful effects of smoking, only about 13% to 40% quit smoking before they become pregnant or once they learn they are pregnant. The remainder may reduce the number of cigarettes they smoke or continue to smoke throughout their pregnancy. Even among those who quit before or during pregnancy, relapse to smoking postpartum is common.

Assisting women who smoke during pregnancy and women who smoke and are of childbearing age to quit smoking is an important public health issue. Those who develop cessation programs targeted for pregnant women need to understand the reasons women continue to smoke during pregnancy, and relapse during or after pregnancy, and subsequently incorporate these factors into their programs.



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# SECOND-HAND SMOKE (SHS)

## Quick Facts

- Second-hand smoke (SHS) (also referred to as “environmental tobacco smoke” or “tobacco smoke pollution”) contains cancer-causing chemicals, and these chemicals are inhaled and absorbed by non-smokers and smokers.<sup>1</sup>
- Traces of carcinogens and other toxins are found in the blood, urine, saliva and breast milk of non-smokers, even after limited exposure to SHS.<sup>2</sup>
- SHS exposure is a cause of lung cancer in non-smokers.<sup>2</sup> Estimates indicate that more than 300 non-smokers die each year in Canada from SHS-related lung cancer.<sup>2</sup>
- SHS increases the risk of ischemic (coronary) heart disease in non-smokers.<sup>2</sup> Estimates indicate that more than 700 Canadians will die each year from coronary heart disease as a result of exposure to SHS.<sup>4</sup>
- Adult non-smokers living with smokers increase their risk of heart disease by about 25%.<sup>5</sup>
- SHS causes diseases of the lower respiratory tract, respiratory irritation, middle ear disease and worsened asthma in children.<sup>1, 6-9</sup>
- In 2006, 14% of Albertans and 15% of Canadians were exposed to SHS in their homes.<sup>10</sup>



- In 2004/2005, 25% of Alberta youth in grades 5 to 9 were exposed to SHS in their home.<sup>11</sup>
- A large proportion of workplaces have some form of smoking restriction.<sup>10</sup>
- In 2006, most Canadians and Albertans felt that there should be some form of smoking restriction in restaurants, bars, and the workplace.<sup>10</sup>

## SECOND-HAND SMOKE (SHS)

Second-hand smoke (SHS) exposure is an important issue in tobacco control and smoking reduction. The risk of disease and death as a result of smoking is not limited to smokers; non-smokers are also at risk from exposure to SHS. The overwhelming body of medical evidence, contained in hundreds of scientific studies and six internationally recognized comprehensive reviews undertaken during the last decade, clearly demonstrates the direct causes and linkages between exposure to second-hand smoke and serious health effects in non-smokers.<sup>1, 2</sup> This chapter explores the basics of SHS, what it is, the health effects, the prevalence of exposure and what is being done about it nationally and provincially.

### What is Second-Hand Smoke?

SHS is also referred to as “tobacco smoke pollution,” “environmental tobacco smoke,” “passive smoking” and “involuntary smoking.” It is made up of the smoke that comes from the burning tip of a cigarette, pipe or cigar (sidestream smoke) and the smoke that is exhaled from the smoker (mainstream smoke). Sidestream smoke makes up most of SHS, about 85% in fact.<sup>12</sup> It has a different chemical composition than mainstream smoke because it is generated at lower burning temperatures, and the combustion (burning) is not as clean or complete.<sup>13</sup>

#### ***SHS contains at least 50 known cancer-causing chemicals.<sup>2</sup>***

In 1992, the U.S. Environmental Protection Agency declared SHS a Class A carcinogen (which means that SHS causes cancer in humans). The study concluded that 50 of the 4,000 chemicals in SHS are known to cause cancer. Research has determined that sidestream smoke has higher levels of carcinogens than mainstream smoke.<sup>13, 2</sup> In addition, some of the carcinogens in SHS were found to have no known safe level of exposure.<sup>5</sup> SHS has twice as much nicotine and tar as the smoke that smokers inhale. It also has approximately five times as much carbon monoxide as the smoke that smokers inhale (carbon monoxide decreases the amount of oxygen the blood can carry to tissues).<sup>1</sup>

#### ***These chemicals are inhaled and absorbed by non-smokers.***

Two-thirds of smoke from a burning cigarette is not inhaled by the smoker but is released into the surrounding environment.<sup>2</sup> Research has shown that non-smokers absorb some of the toxic chemicals and carcinogens from SHS. Researchers have found traces of these toxins in the blood, urine, saliva and breast milk of non-smokers, even after limited exposure.<sup>2</sup>

## Health Effects of SHS

### ***People regularly exposed to SHS are put at an increased risk for developing health problems related to SHS.***

The health of smokers and non-smokers is compromised by SHS as they breathe in both the sidestream and mainstream smoke. The chemicals that are inhaled from SHS are not safe for humans. It is not surprising then that they can cause or increase the risk for serious health problems or make existing health problems even worse.

Most Canadians know that SHS is related to health problems in non-smokers. In a national survey by Health Canada (1999), 70% of current smokers and 88% of non-smokers said that they believe there is a link between SHS and health problems in non-smokers.<sup>14</sup> Despite this, second-hand smoke exposure causes over 1,000 deaths per year in Canada.<sup>3,4</sup> In 2006, the U.S. surgeon general's office released a report on the health consequences of second-hand smoke exposure. The following are major conclusions made in this report.<sup>15</sup>

- *Second-hand smoke causes premature death and disease in children and in adults who do not smoke.*
- *Children exposed to second-hand smoke are at an increased risk for sudden infant death syndrome, acute respiratory infections, ear problems and more severe asthma. Smoking by parents causes respiratory symptoms and slows lung growth in their children.*
- *Exposure of adults to second-hand smoke has immediate adverse effects on the cardiovascular system and causes coronary heart disease and lung cancer.*
- *The scientific evidence indicates that there is no risk-free level of exposure to second-hand smoke.*

### **SHS and cancer**

#### ***SHS is a cause of lung cancer in adult non-smokers.***

Knowing that the cancer-causing agents in SHS are the same as those inhaled by smokers, it is not surprising that SHS is a cause of lung cancer in non-smokers.<sup>2, 20-24</sup> In Canada, over 300 non-smokers die of lung cancer due to SHS exposure each year.<sup>3</sup>

Evidence has been brought forward by the International Agency for Research on Cancer with a scientific working group of 29 experts. This scientific panel conducted a meta-analysis of more than 50 international studies of exposure to second-hand smoke and lung cancer risk for non-smokers over the past 25 years. The panel concluded, "involuntary smoking is a cause of lung cancer in never smokers." Moreover, the panel reported a statistically significant and consistent increase between lung

Researchers know these chemicals are not from other sources because the carcinogens they have found are specific to tobacco.<sup>16</sup> In addition, cotinine, a metabolite of nicotine, is found in the secretions of non-smokers.<sup>1</sup>

Second-hand smoke has been found to cause more skin tumours in mice than mainstream smoke.<sup>13</sup> (Mouse skin studies are commonly used in this field to determine cancer-causing potential.)

Pets are at increased risk for SHS-related cancers too. Studies show an increased risk for lung cancer and nasal cancer in dogs,<sup>17, 18</sup> and increased risk of leukemia in cats.<sup>19</sup> Pets do not only inhale the smoke, but in the process of grooming themselves, they also ingest the SHS particles which have become embedded in their fur.<sup>19</sup>

In October of 2002, the Workplace Safety and Insurance Board awarded a settlement to Heather Crowe, an Ottawa waitress who did not smoke but developed lung cancer as a result of second-hand smoke exposure in the workplace. A lifelong non-smoker, Heather Crowe worked as a waitress in various restaurants and bars across the country for 40 years. In March of 2002, she discovered three lumps in the side of her neck, and a subsequent x-ray showed a large tumour in her chest. The diagnosis confirmed that Heather had lung cancer because of her long exposure to second-hand smoke. Heather Crowe died May 22, 2006.<sup>26</sup>

Second-hand smoke is an avoidable cause of lung cancer in non-smokers.

cancer occurrence in non-smokers exposed to second-hand smoke from active smokers, whether they were exposed to it by their spouses or in the workplace. Non-smoking spouses of smokers had an estimated 20% to 30% increased risk of lung cancer. People exposed to SHS in the workplace had a 12% to 19% increased risk of lung cancer.<sup>25</sup>

### Building the evidence

Support for the causal link between SHS and lung cancer in non-smokers is strengthened by the fact that it is based on several different kinds of evidence, including epidemiological, biological, dose-response and indirect estimates.<sup>27</sup> This link has been established by the following:<sup>28</sup>

- Over 25 years of international epidemiological studies have found an increased risk of lung cancer among lifelong non-smokers living with long-term smokers.
- Biological studies have confirmed that non-smokers inhale and metabolize the same carcinogens in tobacco smoke that cause lung cancer in active smokers, and that measures of tobacco smoke inhalation and known carcinogens are elevated in passive smokers.
- Studies have shown a dose-response relationship, indicating that the greater the amount and length of SHS exposure, the greater the associated risk.
- Calculations of increased risk in non-smokers based on extrapolations from the known risk in smokers are in keeping with findings from epidemiological and biological studies.

### Other forms of cancer

At this point, there is no conclusive evidence to indicate a causal relationship between second-hand smoke and breast cancer or nasal sinus cancer; however, evidence does suggest a relationship. More research is needed in this area before strong conclusions can be made.<sup>2</sup>

### SHS and heart disease

There is evidence that chronic exposure to SHS increases the risk of coronary heart disease in male and female non-smokers. Research indicates that SHS exposure increases the risk of coronary heart disease by 25% to 30%.<sup>15</sup> Estimating the number of cardiovascular deaths that are associated with SHS is a complex task, since there are multiple settings of potential exposure including the home, workplace and public places. However, estimates can be made based on what is known about the exposure levels in specific environments. It is estimated that more than 700 Canadians will die each year from coronary heart disease as a result of SHS exposure.<sup>4</sup>



### ***Understanding SHS and heart disease***

Many people are still unaware of the effects that SHS has on the heart and blood vessels, even though there are more SHS-related ischemic heart disease deaths than lung cancer deaths caused by SHS.<sup>30</sup> SHS contains at least five times more carbon monoxide than mainstream smoke, and carbon monoxide has immediate negative effects on the heart. SHS can affect the heart within 20 minutes of exposure.

Within 20 minutes to eight hours of exposure, SHS

- increases the resting heart rate, blood pressure and blood carboxyhemoglobin (the compound formed by carbon monoxide and blood hemoglobin that causes carbon monoxide poisoning)
- increases the heart's need for oxygen while compromising its supply and decreasing its ability to process it efficiently
- can worsen the symptoms of angina in people with existing heart disease

With prolonged exposure, SHS

- increases the risk of coronary thrombosis (blood clots) and heart attack<sup>31</sup>
- may cause hardening, clogging and obstruction of arteries<sup>31</sup>
- increases the risk of heart disease by about 25% to 30%<sup>15</sup>

### **SHS and other health problems**

#### ***SHS and strokes***

The link between direct smoking and strokes has been established, like the link between smoking and heart disease.<sup>33-38</sup> Unlike heart disease, there has been less research on SHS exposure and strokes. A 2005 study conducted in China found that non-smoking women whose husbands smoked were more likely to suffer strokes. Moreover, the study found that as men's smoking habits increased so did the prevalence of stroke among their non-smoking wives.<sup>35</sup> More research is needed in this area before strong conclusions can be made.

#### ***SHS can make existing health problems worse.***

SHS is a health hazard, not only for people who live with it day to day, but also for people who are exposed to it only occasionally (for instance, in restaurants or bars) and for short periods of time. One health hazard exacerbated by SHS is asthma. A 2005 study found that high levels of recent SHS exposure (e.g., exposure in restaurants or bars) were related to greater asthma severity and poorer asthma outcomes among adults.<sup>39</sup>

Pitsavos, Panagiotakos and Chrysohooou (2002) surveyed 847 individuals who experienced acute coronary syndromes (indicative of coronary heart disease), and found that non-smokers who were regularly exposed to second-hand smoke in the workplace and home (30 minutes or more each day) had a 47% greater risk of developing acute coronary syndromes than non-smokers who were not exposed to second-hand smoke. This study is not only consistent with other scientific evidence on increased coronary risk and second-hand smoke exposure, but supports the hypothesis that the risk of developing acute coronary syndrome is increased with exposure to second-hand smoke in the workplace and home.<sup>29</sup>

Second-hand smoke is an avoidable cause of ischemic (coronary) heart disease in non-smokers.<sup>2, 32</sup>

***SHS can affect a non-smoker's nose, lungs, throat and eyes.***

SHS affects the respiratory health of non-smokers and can cause odour annoyance and nasal irritation. It is associated with reduced lung function, increased coughing, phlegm production, and chest discomfort.<sup>5</sup> It can also cause eye irritation, sore throat and nausea in non-smokers.<sup>15</sup>

**SHS and Health Effects Among Children*****Prenatal exposure to SHS has severe health consequences for the baby.<sup>2</sup>***

Research indicates that exposure to SHS during pregnancy results in reduced birth weight and may lead to preterm delivery. Prenatal and postnatal exposure to SHS can also have adverse effects on lung growth and reduce lung function in children. Prenatal and postnatal exposure is associated with an increased risk of childhood cancer and brain tumours; however, more research is needed to determine whether there is a causal relationship between SHS exposure and these diseases.<sup>2</sup>

Children are particularly vulnerable to SHS because their lungs are still growing and developing. Additionally, children breathe at a quicker rate than adults, taking in more air relative to their body weight, and therefore consume a greater concentration of pollutants than adults.<sup>41</sup>

***Exposure to SHS is a cause of sudden infant death syndrome.<sup>2, 40</sup>***

The risk of sudden infant death syndrome (SIDS) is two to three times higher when a woman smokes during pregnancy.<sup>40</sup> Infants are at increased risk for SIDS if other people in the household smoke, even if their mothers do not smoke.<sup>40</sup>

***Children who are exposed to SHS can develop diseases of the lower respiratory tract such as bronchitis and pneumonia.<sup>2, 6-8, 42</sup>***

Children with at least one smoking parent have a 25% to 40% increased risk of chronic respiratory symptoms (such as cough, wheeze, breathlessness, and phlegm) than children not exposed to SHS at home.<sup>43</sup> In addition, young children of parents who smoke are twice as likely to suffer from serious respiratory infection requiring hospitalization.<sup>44</sup> Fifteen to 23% of hospitalizations for lower respiratory illnesses in young children are due to SHS exposure. Each year in Canada, an estimated 13 to 20 children die from lower respiratory tract infections.<sup>45</sup>

SHS causes other respiratory conditions, including coughs, colds, tonsillitis and adenoid problems.<sup>1</sup> About 16% of all physician visits for coughs, 24% of all tonsillectomies and adenoidectomies, and 20% of all lung infections in children under the age of five are attributable to SHS.<sup>45</sup> In 1997, Cook and Strachan estimated that in Canada this amounts to about<sup>7</sup>

- 43,600 cases of bronchitis
- 19,000 cases of pneumonia
- 200,000 physician visits for coughs
- 2,100 tonsillectomies/adenoidectomies

***SHS can cause middle ear disease (including acute and recurrent otitis media) in children.*<sup>1, 2</sup>**

Commonly known as fluid in the middle ear, middle ear disease affects up to 46% of children by the age of three years.<sup>46</sup> It is the most common reason for surgery in young children, resulting in 16,500 tympanostomies (ear tube operations) in Canada each year. SHS is estimated to be responsible for as many as 13% of all cases of middle ear disease in pre-schoolers in Canada, or about 220,000 cases each year.<sup>45</sup>

***SHS makes existing asthma worse and can contribute to the onset of asthma.*<sup>2, 5, 9, 47</sup>**

According to a British study, symptoms of asthma are twice as common in the children of smokers.<sup>48</sup> SHS can also lead to a 10% increased risk of developing asthma in children ages six to 18 years who have a smoking parent, as well as worsen existing asthma by increasing the frequency of asthma attacks.<sup>8, 49</sup>

Based on a 1996 study it was estimated that, in Canada, 52,000 visits to the doctor for aggravated asthma in children are attributed to SHS.<sup>45</sup> Between 8% and 13% of all new cases of asthma are due to SHS exposure.<sup>7</sup>

In a regional study of childhood asthma conducted in Red Deer and Medicine Hat, University of Alberta researchers found that 46% of children with asthma had a parent who smoked. The study also found that 46% of adults with asthma were exposed to SHS on a daily basis.<sup>50</sup>

**Prevalence of Second-Hand Smoke Exposure**

This section addresses the prevalence of SHS exposure. Legislation and bylaws that restrict smoking can reduce the rates of SHS exposure. The Smoke-Free Places Act became law in Alberta on January 1, 2006. The act restricts smoking in any public place and workplace where minors are permitted in Alberta. Any effects of this law are not reflected in the results from surveys that occurred prior to implementation of this act. This is the case for the data presented in this section.

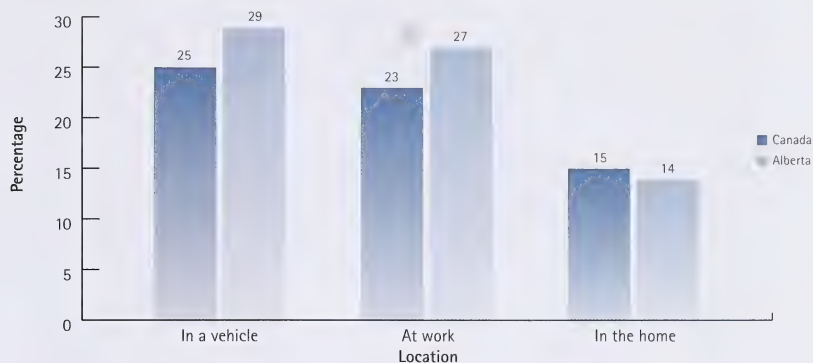
***A large number of Canadians and Albertans are exposed to SHS.***

Canadians and Albertans are exposed to SHS in a variety of places. The rates of exposure depend on the setting and restrictions. Common settings for exposure to second-hand smoke include the vehicle, the workplace, the home, and public places such as bars, restaurants, schools, shopping malls, arenas and so on.

On May 31, 2007, legislation was proposed in Alberta to ban smoking in all public places in Alberta. If passed in its proposed form, smoking would no longer be permitted, even in designated smoking rooms and public workplaces that exclude minors across Alberta. In effect, Alberta would join the majority of the provinces in being 100% smoke-free in public places.



Figure 1. Prevalence of SHS exposure in a vehicle, at work, and in the home, Canada and Alberta, 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>10</sup>

The 2006 CTUMS respondents were asked how frequently they were exposed to SHS in places other than their own home. The results indicated that 12% of Canadians were exposed to SHS every day, another 13% were exposed almost every day, and 36% were exposed at least once a week. As for Alberta, 14% were exposed to SHS every day, 13% were exposed almost every day, and another 34% were exposed at least once a week.<sup>12</sup>

In a 1992 report by the Royal College of Physicians in Britain, it was reported that children of smoking parents inhale the same amount of nicotine as if they themselves smoked 60 to 150 cigarettes a year.<sup>41</sup>

### In a vehicle

Enclosed spaces retain and concentrate the harmful chemicals released when tobacco burns. This makes smoking in vehicles especially dangerous.<sup>51, 52</sup>

#### Canada

The 2006 Canadian Tobacco Use Monitoring Survey (CTUMS) revealed that 25% of Canadians reported being exposed to SHS in a vehicle within the month before the survey. In terms of gender, 27% of males and 22% of females were exposed to SHS. When examined by age group, 48% of youth 15 to 19 years of age and 51% of young adults 20 to 24 years of age reported exposure to SHS in a vehicle; 20% of people 25 years of age and older reported exposure to SHS.<sup>10</sup> According to the 2004/2005 Youth Smoking Survey (YSS), 26% of students in grades 5 to 9 were exposed to SHS in a vehicle within a week before the survey.<sup>11</sup>

#### Alberta

The 2006 CTUMS revealed that 29% of Albertans were exposed to SHS in a vehicle. In terms of gender, 32% of males and 25% of females 15 years of age and older were exposed to SHS. When examined by age groups, 50% of youth 15 to 19 years of age and 53% of young adults 20 to 24 years of age reported exposure to SHS in a vehicle; 23% of people 25 years of age and older reported exposure to SHS.<sup>10</sup> The 2004/2005 YSS indicated that 32% of students in grades 5 to 9 were exposed to SHS in a vehicle.<sup>11</sup> The 2005 TAYES results indicated that 35% of student in grades 7 to 12 were exposed to SHS in a car at least once a week.<sup>53</sup>

### In the workplace

#### Canada

In the 2006 CTUMS, 23% of Canadians reported being exposed to SHS at work within the month preceding the survey. Of youth aged 15 to 19, 20% reported SHS exposure at work. Of young adults aged 20 to 24,



34% reported being exposed to SHS at work. People who worked in the occupational area of trades, transport or equipment operation had the highest levels of exposure to SHS in the workplace (46%) followed by those who worked in the area of processing, manufacturing or utilities (36%).<sup>12</sup>

### *Alberta*

The 2006 CTUMS revealed that 27% of Albertans reported being exposed to SHS at work in the month preceding the survey. Twenty-nine per cent of people aged 15 to 19 reported SHS exposure and 41% of people aged 20 to 24 reported SHS exposure. People who worked in the occupational area of processing, manufacturing or utilities reported the highest levels of exposure to SHS in the workplace (58%<sup>†</sup>), followed by those who worked in the area of trades, transport or equipment operation (51%).<sup>12</sup>

### **In the home**

#### *Canada*

According to the 2006 CTUMS, 15% of Canadians were exposed to SHS in their home, a decrease from a rate of 17% in 2004, 21% in 2002 and 25% in 1999. In 2006, Quebec had the highest SHS exposure rate in the home at 22% and British Columbia had the lowest exposure rate at 8%.<sup>10</sup> The 2004/2005 YSS results indicated that 23% of students in grades 5 to 9 were exposed to SHS in the home every day or almost every day.<sup>11</sup>

#### *Alberta*

The 2006 CTUMS found that 14% of Albertans were exposed to SHS in their home, a decrease from a rate of 16% in 2004, 23% in 2002 and 26% in 1999.<sup>12</sup> According to the 2004/2005 YSS, 25% of students in grades 5 to 9 were exposed to SHS in the home every day or almost every day.<sup>11</sup> According to The Alberta Youth Experience Survey (TAYES, 2005), 35% of students in grades 7 to 12 were exposed to SHS in the home every day or almost every day.<sup>55</sup>

### **In other public places**

The 2006 CTUMS asked respondents about their exposure to SHS in places other than their own home within the month preceding the survey. Table 1 illustrates the national and provincial findings. In general, the findings suggest that youth aged 15 to 19 and young adults aged 20 to 24 were more often exposed to SHS than were people aged 15 years and older.

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

Table 1. Past-month exposure to SHS in places other than own home, by age group, Canada and Alberta, 2006

Location	Canada (%)			Alberta (%)		
	Age group			Age group		
	15+	15-19	20-24	15+	15-19	20-24
At an entrance to a building	50	56	59	53	56	60
Outdoors such as on a sidewalk or in a park	50	69	64	55	68	66
At any other public place such as a shopping mall, arena, bingo hall, concert or sporting event	33	56	46	38	58	47
Someone else's home	29	44	48	27	45	43
On an outdoor patio of a restaurant or bar	31	37	52	29	38	41
Inside a restaurant	13	16	17	18	23	26
Inside a bar or tavern	13	14	31	29	23	52
At a bus stop or shelter	15	38	28	16	38	23
At your school	8	48	25	6	40	15

Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>10</sup>

## Reducing Exposure to SHS

### Legislation and bylaws

The Smoke-Free Places Act became law in Alberta on January 1, 2006. The act restricts smoking in any public place and workplace where minors are permitted. Bylaws that prohibited smoking in all public places and workplaces continued to preside as local policy; these communities were not affected by the provincial policy. However, in the case that bylaws did not adequately protect minors from tobacco smoke, the Smoke-Free Places Act took precedent. The following is a list of places that must be smoke-free if minors are permitted to enter:

- restaurants, banquet halls and entertainment facilities
- health-care facilities
- public and private schools and school property
- common areas in residential buildings (hotels, motels, apartment and condominium buildings)
- all offices and government buildings
- work vehicles
- all enclosed public places including parking garages
- day nurseries
- reserved seating in sporting arenas or entertainment venues

In Alberta, there is a movement towards a 100% smoke-free policy for public places. On May 31, 2007, legislation was proposed in Alberta to ban smoking in all public places in Alberta. If passed in its proposed form, smoking would no longer be permitted in designated smoking rooms and in public workplaces that exclude minors across Alberta. In effect, Alberta would join the majority of the provinces in being 100% smoke-free in public places.

In addition to the Smoke-Free Places Act, the Prevention of Youth Tobacco Use Act (which took effect April 1, 2003) prohibits Alberta youth from possessing and using tobacco products in public places. Youth under the age of 18 who are in possession of, or using, tobacco in a public place in Alberta may be fined \$100 and have the product confiscated.<sup>57</sup>

On July 1, 2005, Edmonton's Smoking Bylaw took effect. This bylaw prohibits smoking in all public places including bars, casinos and bingo halls.<sup>58</sup> The city of Calgary introduced a smoking bylaw in March of 2003 that decreed all public places in Calgary become smoke-free by January 1, 2008.<sup>59</sup>

In 1997, the federal government passed the Canada Tobacco Act, which includes restrictions on tobacco manufacturing, marketing and sales. Most provinces and municipalities have recently introduced legislation to complement the Federal Tobacco Act.

Recent research has found that implementation of smoking restrictions and regulations in the hospitality industry, namely restaurants and bars, has resulted in decreased exposure to SHS.<sup>60-63</sup> Implementing such restrictions, however, may be met with resistance. One reason for this is a perception that smoke-free legislation and restrictions hurt the hospitality industry economically. However, researchers from the Ontario Tobacco Research Unit reviewed 28 studies from Canada and the U.S. and concluded that "smoke-free legislation does not have a negative impact on the sales, revenues, profits and employment of restaurants, bars, hotels, and gaming facilities over the long term." The researchers do note that there may be short-term economic downswings (particularly in terms of liquor purchases) but in the long term there is no impact. Also of interest, the researchers found that as a corollary of the legislation, smokers dine out less while non-smokers dine out more.<sup>64</sup> The 2006 U.S. surgeon general's report on SHS exposure also concludes that "smoke-free policies and regulations do not have an adverse economic impact on the hospitality industry."<sup>65</sup>

There is considerable variation in the way municipal governments across Alberta have dealt with smoking in public places and workplaces. Proposed implementations of smoking bylaws in municipalities have stimulated much debate across the province.

The federal government has power to prohibit or restrict smoking on federal land, in federal corporations, and in areas where the federal government has jurisdiction (e.g., transportation, communications, banking).

Provincial governments have power to prohibit or restrict smoking in their jurisdiction, such as the workplace and public places.

Municipal and regional governments have authority to prohibit or restrict smoking anywhere within their geographic limits.<sup>56</sup>

## Restrictions

SHS is an air pollutant with serious health consequences. Since even short exposure harms the human body, reducing SHS is essential to public health.

### In the home

Household smoking rules can protect children, pregnant women, non-smoking spouses, or other non-smoking adult household members from SHS. Household restrictions can also help smokers cut down on their cigarette consumption, help smokers quit, and help quitters abstain from smoking.<sup>2</sup> Recent research has found that youth who live in a household with an indoor smoking ban were more likely to perceive lower smoking rates among their parents, and perceive a greater parental disapproval of adult and teen smoking. These perceptions may reduce the likelihood that youth will smoke.<sup>66</sup> Household restrictions may also reduce or eliminate the risk of fires caused by discarded cigarettes.<sup>2</sup>

#### Canada

According to the 2006 CTUMS, 89% of Canadians did not allow smoking in their home. Among households that allowed smoking or where cigarettes were smoked in the home, 45% of households had restrictions in place to limit exposure to SHS. Of those houses that restricted smoking in their home 71% restricted smoking to certain rooms, 23% restricted smoking in the presence of young children, and 39% allowed smoking only if the windows were open or there was another type of ventilation.<sup>12</sup>

#### Alberta

The 2006 CTUMS indicated that 93% of Albertans did not allow smoking in their home. Among those Albertans that allowed smoking in their home or where cigarettes were smoked in the home, 42% had restrictions in place to limit exposure to SHS. Of those houses that restricted smoking in their home 65% restricted smoking to certain rooms, 34% restricted smoking in the presence of young children, and 35% allowed smoking only if the windows were open or there was another type of ventilation.<sup>12</sup>

### In a vehicle

The Ontario Medical Association has recommended to the Ontario government that the use of tobacco be banned in vehicles used to transport children.<sup>26, 68</sup>

### In the workplace

Workplace restrictions are effective in reducing SHS exposure.<sup>2</sup> Smokers who are employed in workplaces with smoking bans are likely to consume fewer cigarettes per day, are more likely to be considering quitting, and quit at a higher rate than do smokers employed in workplaces with weak or non-existent policies.<sup>2, 69</sup> Workplaces are therefore increasingly adopting

Emmons et al. (2001) found that household smoking restrictions reduced exposure rates to SHS but did not completely eliminate exposure.<sup>67</sup>

Health Canada has published a handbook for those who want to make their home and car smoke-free. This can be accessed on their website at [http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/index_e.html)



smoking control policies, which are designed to protect non-smokers from the health hazards of second-hand smoke, and to help workers who smoke to quit.<sup>70</sup> Reducing occupational exposure to smoking should lead to improved employee health. This also improves productivity of the organization, and lowers smoking-related costs such as accidents, damage to property, and cleaning expenses.<sup>71</sup>

### *Canada*

According to the 2006 CTUMS, 91% of Canadians reported some form of smoking restriction at work.<sup>72</sup> Fifty-three per cent of Canadians reported complete restrictions on smoking at work, 42% reported that smoking was only allowed in designated areas, 7% reported that smoking was restricted only in certain places and 5% reported that smoking was not restricted at all.

People who worked in the occupational areas of social science, education, government or religion reported the highest level of complete smoking restrictions (68%) whereas people working in the occupational area of primary industry reported the highest levels of not having smoking restrictions (34%).<sup>10</sup>

### *Alberta*

According to the 2006 CTUMS, 91% of Albertans reported some form of smoking restriction at work.<sup>72</sup> Thirty-five per cent of Albertans reported complete restrictions on smoking at work, 48% reported that smoking was only allowed in designated areas, 8% reported that smoking was restricted only in certain places and 9% reported that smoking was not restricted at all.

People who worked in the occupational areas of social science, education, government or religion reported the highest level of complete smoking restrictions (61%) whereas people working in primary industry reported the highest levels of not having smoking restrictions (26%)<sup>†, 10</sup>

Moher and Lancaster (2002) found that the main strategy for reducing SHS involves restrictions or total bans on smoking in workplaces. Successful implementation of such bans usually involves some form of support for workers who smoke (such as advice from a health professional, individual and group counselling, pharmacological treatment to overcome addiction). Programmes for smoking cessation may also be offered independently of a workplace policy.<sup>73</sup>

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

There are several options proposed to deal with workplace tobacco control.<sup>74</sup>

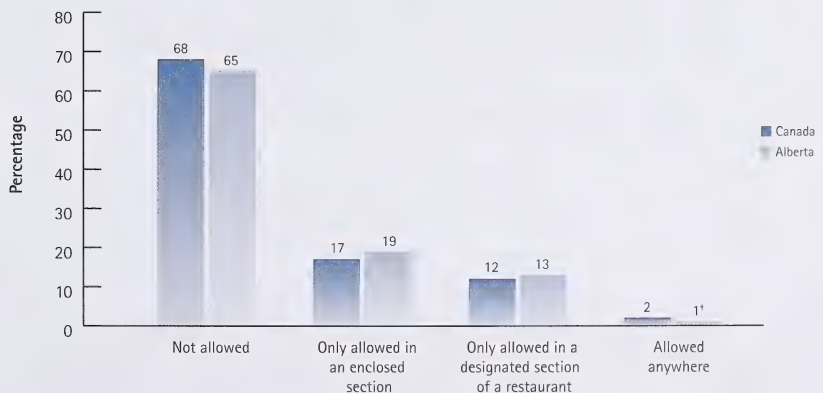
1. Ban all indoor and outdoor smoking (most effective and beneficial option: total ban combined with support for people who smoke).
2. Ban smoking indoors. Outdoors, ban it within a specific distance from doors, windows and intake vents (three to nine metres as appropriate to the workplace facilities and design).
3. Restrict indoor smoking to designated, enclosed areas that are separately ventilated and directly exhausted to the outside. The ventilation should conform to standards that allow an air exchange rate of 30 litres per second per person. Designated smoking areas should be located in a non-work area that no one is required to enter as part of his or her responsibilities.

The U.S. surgeon general's report *The Health Consequences of Involuntary Exposure to Tobacco Smoke* provides more detail on policy approaches to SHS and restrictions of SHS.<sup>2</sup>

### Public Opinion on Restrictions

The 2006 CTUMS asked Canadians and Albertans how they felt about smoking in restaurants, bars, and the workplace. In general, most Canadians and Albertans felt that there should be some form of smoking restriction in restaurants, bars, and the workplace. Figures 2 to 4 summarize their responses.

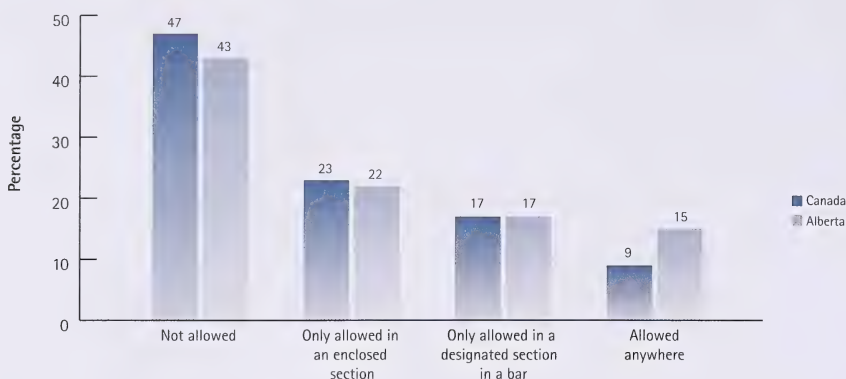
Figure 2. Public agreement on different levels of smoking restrictions in a restaurant, Canada and Alberta, 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>10</sup>

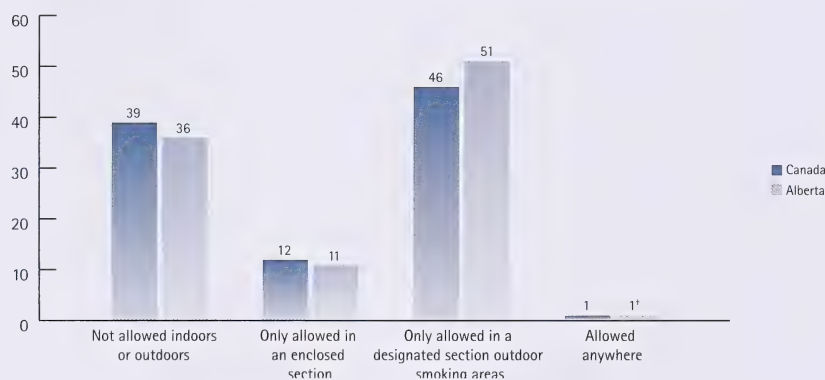
\* Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

Figure 3. Public agreement on different levels of smoking restrictions in a bar, Canada and Alberta, 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>10</sup>

Figure 4. Public agreement on different levels of smoking restrictions in the workplace Canada and Alberta, 2006



Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>10</sup>

\* Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

In a 2005 public awareness campaign, youth and adult Albertans were asked whether they agreed or disagreed with various opinion statements regarding tobacco and smoking.<sup>75</sup> The results in percentage of agreement are displayed in Table 2.

Table 2. Percentage agreement with statements about smoking restrictions among Albertan youth, adults, and current adult smokers, 2005

Statement	Youth (%)	Adult (%)	Current adult smoker (%)
Smoking should be banned in all public places	78	73	22
People should not smoke around kids at home	85	91	72
People should not smoke around kids in cars	81	93	72
Smoking should be banned in bars, casinos, and bingo halls	NA	58	12
Smoking should be banned in restaurants	NA	81	41
Smoking should be banned in all workplaces	NA	81	29
People should not smoke in public places where children are present	NA	91	64

Source: Evaluation of the 2005 Alberta Tobacco Reduction Strategy Public Awareness Campaign (2005)<sup>75</sup>

## Ventilation

### ***Ventilating buildings does not eliminate SHS.<sup>2</sup>***

The American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), a world-leading and ventilation standard-setting organization, sets standards and guidelines for ventilation rates. In Canada, the ASHRAE standards are the most widely observed code of ventilation practice.<sup>76</sup> Searches for effective ventilation solutions have proven unsuccessful. A panel of 14 experts in ventilation technology concluded that existing dilution ventilation technology could not effectively remove tobacco smoke from indoor air. Now, ASHRAE no longer provides ventilation standards for air with tobacco smoke in it, but only for air in smoke-free buildings.<sup>76</sup> Currently, no ventilation system exists that is capable of completely eliminating SHS from indoor air.<sup>77</sup>

## The Tobacco Industry

In a recent litigation settlement in the United States, over 40 million pages of tobacco industry documents were made available to the public. This spawned numerous research studies investigating the efforts of the tobacco industry to address SHS. Many of the studies that investigated the documents revealed that American and Canadian tobacco industries made widespread efforts to cloud the scientific debate regarding the deleterious health effects of SHS and to misinform consumers and the public about the harmful consequences of SHS.<sup>26, 78-81</sup>



For instance, in 1998 the International Agency for Research on Cancer (IARC), a division of the World Health Organization, concluded that non-smoking spouses of smokers were at an increased risk for developing lung cancer.<sup>82</sup> In response to this powerful study, tobacco industry giant, Philip Morris, released an internal corporate memo stating

*...we need to move along parallel tracks, simultaneously seeking to slow down progress at the national clinical level while seeking to take advantage of budgetary constraints and a new IARC director with new priorities, to fully exploit any openings to get the study shelved altogether. In tandem, we need to build a solid foundation of scientific criticism which can be activated with respect to the methodology, junk science and the misuse of epidemiology within that context. Finally, we need to be simultaneously working to create a regulatory and public opinion climate which will mute the impact of negative study results.<sup>26</sup>*

Another instance of the tobacco industry's efforts to persuade scientific debate was exposed by researchers Tong, England, and Glantz in 2004. Tong et al. (2004) stated that executives at the Philip Morris tobacco company feared that research identifying a causal relationship between SHS and sudden infant death syndrome (SIDS) would motivate efforts to designate smoke-free places in the home, public areas, and the workplace.<sup>83</sup> Consequently, Philip Morris hired scientific consultants to write review articles on the effects of SHS on SIDS that were to be published in medical literature. Originally, the hired consultants concluded that prenatal and postnatal exposure both independently contributed to the onset of SIDS, which confirmed the research Philip Morris feared. However, after encouragement from Philip Morris, one of the hired authors changed his conclusion to align with the interests of Philip Morris. Specifically, the author changed his original conclusion (that SHS is an independent risk factor for SIDS) to assert that the postnatal SHS effects were "less well established."<sup>83</sup>

Not only have there been studies on tobacco-sponsored research, but there have also been studies on the tobacco industry's manipulation of the media. The Ontario Medical Association concludes the tobacco industry has "through mass communication campaigns, purposefully misinformed the public as to the harmful health effects of the use of their products."<sup>26</sup> For example, Philip Morris hired and trained journalists in order to "build considerable reasonable doubt... particularly among consumers" about the "scientific weakness" of research on SHS.<sup>79</sup> In light of this recent research, it is important that findings of research sponsored by the tobacco industry be cautiously considered.

*The tobacco industry's campaign to produce scientific research and influence public opinion on health consequences associated with ETS [environmental tobacco smoke] was developed to protect the financial and political interests of the companies... As long as the industry could deny the health risk associated with ETS, they met their goal—preserving the status quo.*

—Richard D. Hurt, M.D., Medical Director of the Mayo Clinic Nicotine Dependence Center.<sup>84</sup>



## Summary

Second-hand smoke increases the risk of several diseases and is associated with other adverse health effects. The risk of disease as a result of smoking is not limited to smokers; in fact, many Canadians and Albertans who are non-smokers are also at risk.

Scientific reviews have identified 15 diseases or conditions as known or suspected to be caused by exposure to SHS. Chronic exposure to SHS increases the risk of lung cancer, heart disease, nasal sinus cancer, a variety of respiratory conditions such as asthma, middle ear disease, bronchitis and pneumonia (particularly in children), and SIDS.

People are exposed to SHS in their home, the workplace, private vehicles, and public places such as restaurants and bars. Recent legislation and policy promotes smoke-free public places. Over half of Canadians and Albertans are in favour of restricting smoking completely in restaurants; however, there is a greater range of opinion when it comes to smoking restrictions in bars and in the workplace. Implementing legislation and policies, and providing smoking interventions are effective ways of reducing SHS exposure for both smokers and non-smokers.

The recent release of tobacco industry documents to the public has triggered numerous investigations into the practices and efforts made by the tobacco industry. Many of these investigations indicate that tobacco industry efforts were not in the best interests of the public.

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# SMOKELESS TOBACCO

## Quick Facts

- A small proportion of Albertans and Canadians use smokeless tobacco.<sup>1</sup>
- In 2006 in Canada and in Alberta, males aged 20 to 24 had higher smokeless tobacco experimentation rates than females and higher rates than males of any other age group.<sup>1</sup>
- In 2006, current and former smokers in Alberta were more likely than never smokers to report having tried smokeless tobacco.<sup>1</sup>
- Many smokeless tobacco users start between 10 and 16 years of age.<sup>2-6</sup>
- Smokeless tobacco is a harmful tobacco product that contains over 3,000 chemicals,<sup>7</sup> including 28 known carcinogens (cancer-causing agents).<sup>8</sup>
- Smokeless tobacco increases the risk of cancers of the oral cavity, pharynx (throat), larynx (voice box), and esophagus.<sup>9-12</sup>
- Smokeless tobacco use can lead to tooth abrasion, gum recession, and leukoplakia (mouth sores that in some cases can become cancerous).<sup>13</sup>

- Smokeless tobacco affects the cardiovascular system and is associated with heart disease, stroke and high blood pressure.<sup>14-20</sup>
- Smokeless tobacco cessation methods should target specific populations to ensure greater success.<sup>21</sup>
- The inherent risks of smokeless tobacco use make it an unviable harm reduction strategy.

## SMOKELESS TOBACCO

Smokeless tobacco use is a significant part of the overall world tobacco problem. Unlike cigarettes and other forms of tobacco, smokeless tobacco is consumed without combustion (without burning). Instead, it is placed in contact with mucous membranes in the mouth or nose, through which nicotine is absorbed into the body. The use of nasal snuff is returning. Different forms of snuff, such as loose or packeted snuff, are used by placing in the mouth. Tobacco may also be prepared in blocks and flakes for chewing. In North America, smokeless tobacco use typically consists of the oral use of snuff (moist or dry). In Central, South and Southeast Asia, smokeless tobacco is usually chewed with another substance, such as ash, lime, cotton, sesame or betel quid (a mixture of nut, lime, and leaves).<sup>22-24</sup>

*Smokeless tobacco comes in two basic forms: snuff and chewing tobacco.* Snuff is finely ground tobacco in a powder form which may be dry, moist, or in sachets (small teabag-like pouches). Some snuff can be inhaled but it is more common for users to hold it between the cheek and gum.<sup>25, 26</sup> Just a pinch of snuff is all that is needed to release the nicotine, which is quickly absorbed into the bloodstream.<sup>27</sup>

Chewing tobacco is coarser than snuff and exists in three forms: loose leaf (sold in a soft package or pouch), plug (sold in a small block or brick form) and twist (dried tobacco leaves that are twisted into strands). Users chew the tobacco for several hours to get a continuous supply of the nicotine in the tobacco.<sup>27</sup>

### Smokeless Tobacco: Prevalence and Experimentation

#### **Prevalence**

The 2006 Canadian Tobacco Use Monitoring Survey (CTUMS) asked respondents who reported trying smokeless tobacco if they had used smokeless tobacco (chewing tobacco, pinch, or snuff) in the last 30 days. According to the 2006 CTUMS, approximately 1%<sup>†</sup> of Canadians and 2%<sup>†</sup> of Albertans used smokeless tobacco in the month before the survey.<sup>1</sup>

#### **Experimentation**

##### **Canada**

The 2006 CTUMS revealed that 8% of Canadians had ever tried smokeless tobacco (chewing tobacco, pinch, or snuff). Experimentation rates were

<sup>†</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

The Centers for Disease Control and the National Cancer Institute have developed a useful fact sheet outlining in detail the various types of smokeless tobacco. It can be found online at <http://cancercontrol.cancer.gov>.<sup>28</sup>



highest among young adult males. In Canada, young adult males aged 20 to 24 (17%) were more likely to report having tried smokeless tobacco than 15- to 19-year-old males (9%) and males 25 years and older (15%). In total, 15% of Canadian males aged 15+ had tried smokeless tobacco.<sup>1</sup>

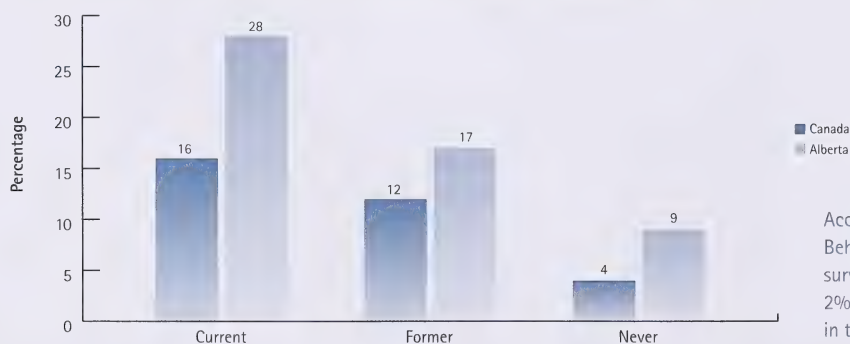
## Alberta

CTUMS (2005) results indicated that 15% of Albertans had ever tried smokeless tobacco. This is higher than the rate for Canadians as a whole. In Alberta, as in Canada as a whole, young adult males aged 20 to 24 (36%) had the highest rates of smokeless tobacco experimentation. Seventeen per cent of 15- to 19-year-old males and 26% of males aged 25 and older have tried smokeless tobacco.<sup>1</sup>

Another finding from the CTUMS data is the rate of smokeless tobacco experimentation among current, former, and never smokers. Past research indicates that current smokers are more likely than former or never smokers to have tried or used smokeless tobacco.<sup>2</sup> Additionally, research suggests that males are more likely than females to experiment with smokeless tobacco.<sup>2</sup> The 2006 CTUMS indicated that, in total, 27% of males had tried smokeless tobacco versus 4%<sup>1</sup> of females. It is important to note that these are rates of experimentation, not rates of regular use.<sup>1</sup> As illustrated in Figure 1, for males aged 15 years and older in Alberta, smokeless tobacco experimentation is highest among current smokers, next highest among former smokers and lowest among never smokers.<sup>1</sup>

Nationally and provincially, smoking status is related to tobacco experimentation. As seen in Figure 1, current smokers had higher smokeless tobacco experimentation rates than former and never smokers.

Figure 1. Smokeless tobacco experimentation rates and smoking status, Canada and Alberta, 2006



According to the 2005 Youth Risk Behavior Surveillance System, a U.S. survey, 8% of youth (14% males and 2% female) used smokeless tobacco in the 30 days before the survey.<sup>29</sup>

Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>1</sup>

Studies show that smokeless tobacco use is higher in certain pockets of the population: among athletes, Aboriginal people, and males.<sup>30, 31</sup>

<sup>1</sup> Subject to moderate sampling variability and therefore results should be interpreted with caution. Sampling variability measures the reliability of the estimate. Estimates with moderate sampling variability are less reliable than estimates with acceptable levels of sampling variability; however, these estimates are still useful indicators.

***Many people who use smokeless tobacco start young, between the ages of 10 and 16, putting them at increased risk for premature death.***<sup>2-6</sup>

This early initiation age means that there is increased opportunity for sustained exposure. For example, people who start to use smokeless tobacco when they are nine will have had over 20 years of exposure by the time they are 30, and over 30 years by the time they are 40. Early initiation of smokeless tobacco use is especially troubling in light of the dire health consequences of smokeless tobacco use. It is a serious public health issue.<sup>8</sup>

## Contents of Smokeless Tobacco

***Both chewing tobacco and snuff are addictive because both contain nicotine.***<sup>14</sup>

The nicotine content in smokeless tobacco varies widely from product to product, and absorption can vary with the amount and length of delivery, and with the pH levels of the product and the user's mouth.<sup>32, 33</sup>

The amount of nicotine absorbed through smokeless tobacco is two to three times the amount delivered by a cigarette. A person who consumes eight to 10 dips or chews per day receives the same amount of nicotine as a heavy smoker who smokes 30 to 40 cigarettes per day.<sup>8</sup>

Most cigarettes have an average of 8.4 mg of nicotine per cigarette. But one dose of moist snuff has an average of 14.5 mg of nicotine, and one dose of chewing tobacco can have as much as 133 mg of nicotine.<sup>32</sup>

Several carcinogens have been identified in smokeless tobacco, the tobacco-specific N-nitrosamines (TSNAs), N-nitrosonornicotine (NNN), and 4-(N-methyl-N-nitrosamino)-1-(3-pyridyl)-1-butanone (NNK) being the most important.<sup>34</sup> The most harmful carcinogens in smokeless tobacco are the tobacco-specific nitrosamines (TSNAs), which are formed from nicotine. NNN and NNK are formed from nicotine during the curing, fermenting and aging process of tobacco production.<sup>7, 35</sup> Other cancer-causing substances in smokeless tobacco include formaldehyde, acetaldehyde, arsenic, nickel, cadmium and benzopyrene.<sup>7</sup>

The concentration of the highly carcinogenic TSNAs is higher in snuff than in other smokeless tobacco products.<sup>34, 35</sup> According to several studies, the three leading snuff brands in the U.S. (which make up 92% of the U.S. market) contain far higher concentrations of nicotine and TSNA than the less popular brands. Thus, the leading U.S. snuff brands have a high level of carcinogenic potential.<sup>34</sup>

## Smokeless Tobacco and Health Effects

Smokeless tobacco contains over 3,000 chemicals,<sup>7</sup> including 28 known carcinogens (cancer-causing compounds).<sup>8</sup> People who are addicted to smokeless tobacco often use it for many years, and this can lead to serious health problems. Serious health problems that can be caused by or are associated with the use of smokeless tobacco include<sup>8, 11, 14, 27, 34, 36, 37</sup>

- cancer of the mouth (including the lip, tongue, inner cheek, and floor and roof of the mouth) and throat
- leukoplakia (white, leathery, pre-cancerous patches that may develop where tobacco is held in the mouth, such as the cheeks, gums or tongue, and may become cancerous)
- gum and tooth disease, leading to cavities, lost teeth and painful sores
- gum recession (the gums pulling away from the teeth), loss of bone in the jaw, tooth abrasion (worn spots on the teeth), yellowing of teeth and chronic bad breath
- cardiovascular problems such as high blood pressure, heart disease and stroke

### Cancer

***Smokeless tobacco increases the risk of oral cancer and cancers of the pharynx, larynx and esophagus.***<sup>10, 11, 27, 34, 36, 37</sup>

People who use chewing tobacco and snuff are at an increased risk for oral cancer.<sup>12, 24, 34</sup> The National Cancer Institute has estimated that in 2005 there were 265 new cases and 85 deaths from oral cancer in Alberta. For Canada, 3,200 new cases and 1,050 deaths from oral cancer were estimated for 2005. About a third of all oral cancer cases are fatal.<sup>38</sup>

The World Health Organization (WHO) reported that oral cancer rates are especially high among men. It is the eleventh most common cancer worldwide,<sup>39</sup> but for men it is the eighth most common cancer worldwide.<sup>40</sup> It is especially common in South-Central Asia, where it ranks among the three most common types of cancer. WHO also states that there have been steep increases in the rates of oral and pharyngeal cancers in many developed countries including Denmark, Germany, Scotland, certain European regions, Australia, Japan, New Zealand and the United States.<sup>41</sup> Tobacco, including smokeless tobacco, is estimated to be responsible for 90% of the cases of oral cancer worldwide.<sup>40</sup>

Surgery to treat oral cancer is extensive, can be disfiguring, and may involve removing parts of the face, tongue, cheek or lip.<sup>42</sup>

Emerging evidence suggests smokeless tobacco use is associated with cancer of the pancreas.<sup>43-45</sup> Because higher levels of TSNA have been found in the pancreatic juice of tobacco users than of non-tobacco users,

Many studies examining the use of smokeless tobacco have been conducted globally, particularly in North America, Sweden and the Middle East. However, different types of smokeless tobacco are consumed in different countries, specifically in terms of content.<sup>47</sup> It is therefore critical to consider these differences before comparing international findings with North American findings.



these chemicals are suspected to be the link between smokeless tobacco use and pancreatic cancer.

### Oral damage

***Smokeless tobacco also leads to leukoplakia, tooth abrasion and gum recession and causes a multitude of problems inside the mouth.***<sup>12, 13</sup>

A study by Severson (1993) showed that two-thirds of regular daily smokeless tobacco users had health problems that could be directly attributed to their use of moist snuff. These symptoms included sore, bleeding and receding gums; oral lesions; and upset stomach.<sup>51</sup>

Smokeless tobacco, whether chewed or snuffed, can lead to inflammation of the oral cavity and oral cancers.<sup>48</sup> Users can develop mouth sores (leukoplakia) that can become cancerous. As well, the grit and sand in smokeless tobacco products can scratch the teeth and wear away tooth enamel. A user's gums can also recede, especially in the spot where the tobacco is usually placed. The injured gums pull away from the teeth, exposing root surfaces, leaving teeth sensitive to heat and cold. This kind of damage is permanent and painful.<sup>13, 49, 50</sup>

A 1998 study showed that 56% of users of smokeless tobacco formed white lesions within seven days of use at the site of smokeless tobacco placement.<sup>52</sup>

The risks of oral cancer and periodontal disease decline as time after cessation increases, and some oral mucosal lesions may resolve with cessation of smokeless tobacco use.<sup>53</sup>

### Cardiovascular diseases

***Smokeless tobacco affects the cardiovascular system and may be associated with heart disease, stroke and high blood pressure.***<sup>14, 18, 19, 27, 54, 55</sup>

Like cigarettes, smokeless tobacco contains nicotine, and nicotine affects the heart. It is not surprising, then, that studies have found that smokeless tobacco increases heart rate and blood pressure,<sup>15, 19, 27, 54, 55</sup> and puts users at increased risk for stroke, coronary heart disease, peripheral vascular disease (that is, diseases of the arteries and veins) and cardiovascular death.<sup>14, 16, 18</sup> However, it should be noted that some studies have shown no relation between smokeless tobacco use and stroke or cardiovascular mortality.<sup>56, 57</sup> Further rigorous studies are needed to determine more clearly the cardiovascular and non-oral cancer risks potentially associated with smokeless tobacco use.<sup>34, 58</sup>

### Smokeless tobacco and lifestyle

#### ***Effect on athletic performance***

The high level of smokeless tobacco use among athletes is alarming.

A 2005 study of U.S. college students showed that, among other factors, participation in intercollegiate sports predicted smokeless tobacco use.<sup>59</sup>

A 1997 U.S. study of student athletes showed that an estimated 23% of college athletes (male and female) in the U.S. used smokeless tobacco, including both chewing tobacco and snuff.<sup>3</sup> In a survey of 754 Canadian university athletes, 25% of males reported that they used smokeless tobacco. Sports that had a high incidence of smokeless tobacco use included football (36%) and hockey (47%).<sup>60</sup> The results of a 2005 survey indicated that 36% of professional baseball players and 25% of minor league baseball players used smokeless tobacco.<sup>61</sup>



Research indicates that smokeless tobacco use does not improve<sup>62-64</sup> and may even hinder athletic performance. Some athletes believe that tobacco use enhances performance, but studies that examine the effects of smokeless tobacco on reaction time in athletes do not show any improvement in performance.<sup>62-64</sup> Research also indicates that smokeless tobacco use is associated with decreased physical activity.<sup>66, 67</sup>

### ***High-risk behaviour***

Although it cannot be claimed that use of smokeless tobacco causes an increase in high-risk behaviour studies have shown that youth who use cigarettes or smokeless tobacco are also more likely than non-users to engage in other high-risk behaviour.<sup>67</sup> This high-risk behaviour includes engaging in the use of other substances (e.g., alcohol and illicit drugs) and in risky sexual behaviour.<sup>67</sup> In addition, youth using smokeless tobacco products appear to be in more psychological distress than non-users, reporting more depression, attempts at suicide, and stress.<sup>68</sup>

Among students who reported using two or more tobacco products, high-risk behaviour is especially pronounced.<sup>60, 67</sup> One study compared students who used both cigarettes and smokeless tobacco, students who used neither, and students who used only cigarettes or only smokeless tobacco. Students who used both cigarettes and smokeless tobacco had the highest likelihood of having ever used cocaine and other illicit substances, of being current users of alcohol, and of being current binge drinkers.<sup>69</sup> A 2000 U.S. study of high school students found that smokeless tobacco use was associated with greater levels of marijuana and alcohol use, physical fighting, weapon possession, and not using a condom during sexual intercourse.<sup>67</sup>

## **Smokeless Tobacco and Harm Reduction**

As stated earlier, smokeless tobacco is addictive and harmful. Some tobacco control strategists nonetheless believe that encouraging a shift toward smokeless tobacco use can be an effective harm reduction approach on the basis that these products may reduce total tobacco-caused death and disease despite exposing users to potentially harmful constituents.<sup>70</sup>

WHO's Scientific Advisory Committee on Tobacco Products Regulation raises a cautionary note in this regard. In the committee's assessment, current evidence does not indicate that use of any smokeless tobacco is free of health risks. They conclude that there is no evidence to support any claims that suggest smokeless tobacco is free of health risks.<sup>71</sup>

The relationship between smokeless tobacco use and smoking is difficult to ascertain. Though some studies find that smokeless tobacco use is more likely to precede smoking,<sup>72, 73</sup> it is more commonly found that smoking precedes smokeless tobacco use.<sup>74</sup>

Although some people may use snuff to quit smoking, a study showed that U.S. men more commonly switch from snuff use to smoking. There is evidence that snuff may serve as a supplemental source of nicotine for some male current smokers. Nearly half of men who used snuff on some days were current smokers, and those who currently smoked only on some days were more likely than never smokers to be current snuff users. Male smokers who used snuff every day smoked, on average, fewer cigarettes per day, again suggesting that snuff may serve as a supplementary source of nicotine. Also, smokers who also use snuff are more likely than non-users of snuff to try to quit smoking but tend to be less successful.<sup>72</sup>

As a specific strategy, the term “harm reduction” generally refers to only those policies and programs that aim at reducing drug-related harm without requiring abstinence from drug use.<sup>75</sup>

Given these uncertainties, other strategists take the view that, regardless of the specific levels of harm caused by smokeless tobacco products, their overall inherent risks do not support smokeless tobacco as a viable harm reduction strategy. The major concern about promoting one tobacco product as less harmful than another is that it may undermine efforts to achieve total tobacco-product cessation or may foster smoking initiation among people who otherwise would not have started.<sup>73</sup>

## Smokeless Tobacco Prevention and Cessation

Therapies and programs for smokeless cessation have generally been adapted from successful smoking cessation methods; however, some of the challenges that smokeless tobacco cessation poses are unique and should be considered in any quit attempt. Some of these challenges are<sup>51</sup>

- the presence of oral lesions, which can be irritated by nicotine gum (estimates suggest that over 50% of users have some degree of oral lesion)
- a strong need for an oral substitute during withdrawal
- the perception that smokeless tobacco is not a harmful tobacco product (users sometimes have less motivation to quit as a result)
- difficulty “fading” nicotine because dosages of smokeless tobacco are individual in amount and length of delivery (“fading” is the gradual and controlled reduction of nicotine intake)
- dual addictions: two levels of intervention may be necessary because many smokeless tobacco users are smokers as well

With regard to cessation, smokers and smokeless tobacco users display a number of notable similarities associated with cessation. They report essentially equivalent levels of nicotine exposure, nicotine dependence, craving, and difficulty in stopping tobacco use.<sup>76</sup>

Recent evidence also suggests that smokeless tobacco users and smokers experience similar levels of withdrawal severity upon quitting.<sup>77</sup> There is evidence to suggest that, as with smokers, the majority of smokeless

tobacco users want to quit but are generally unsuccessful in their attempts to do so.<sup>76</sup> Several U.S. studies have reported that over 50% of smokeless tobacco users would like to quit.<sup>51</sup>

Smokeless tobacco cessation methods should target specific populations to ensure greater success.<sup>21</sup> These are some possible target groups:

### **1. Male youth and young adults (ages 15 to 24)**

Smokeless tobacco use appears to be an important predictor of smoking initiation among young male adults.<sup>30, 31, 73, 74, 78, 79</sup>

### **2. Athletes (both male and female) in sports such as hockey, soccer, and baseball**

Although it is mostly males who consume smokeless tobacco products, more women are participating in sports at all levels. Health professionals need to be alert to the possibility of increased smokeless tobacco use among female athletes, and to be aware of the consequences to women's health.<sup>80</sup>

### **3. Users of one or more tobacco products**

Tobacco use is a predictor of many other types of risky behaviour. This must be kept in mind by those who design programs for the prevention and cessation of tobacco use.<sup>2, 37, 59, 67, 69</sup>

### **4. Aboriginal populations**

Rates of experimentation with smokeless tobacco are higher among Aboriginal youth than in the general population.<sup>78, 79</sup>

## **Smokeless tobacco prevention and cessation methods**

Dentists and dental hygienists are trained to detect oral lesions and periodontal problems that are related to tobacco use. It is thus appropriate for them to help prevent the initiation of tobacco use by children and adolescents through the use of positive anti-tobacco messages. Over the past decade, tobacco cessation strategies have been modified for practical use in dental settings.

A study reviewed several brief interventions by dental professionals to encourage the cessation of smokeless tobacco use: oral cancer screening, cessation advice, self-help materials, and brief cessation counselling by a dental hygienist. This study found that oral screening and brief cessation counselling by dental professionals in the dental office or in athletic facilities were effective in promoting cessation of smokeless tobacco use.<sup>42</sup> Furthermore, a 2006 review showed that behavioural interventions conducted by oral health professionals improved rates of cessation of smokeless tobacco use. Incorporating oral assessments and behavioural interventions in dental practices may encourage cessation of smokeless tobacco use.<sup>81</sup>

Behavioural interventions beyond the dental setting are also effective in helping smokeless tobacco users quit. Specifically, interventions that entail an oral examination as well as feedback about mucosal changes brought on by smokeless tobacco use (e.g., oral cancer, leukoplakia, stomatitis, keratosis, hairy tongue) have been shown to be effective.<sup>82</sup>

In a 2004 review of several studies examining cessation of smokeless tobacco use, there was no indication of benefits of using pharmacotherapy including bupropion, a nicotine patch, or nicotine gum. However, it was suggested that larger trials investigating pharmacotherapy are needed. Research in the area of smokeless tobacco cessation is limited, but seems to suggest that a combination of therapies offers the greatest hope for success.<sup>82</sup>

Refer to the chapter “Cessation of Tobacco Use” for more information about tobacco cessation methods.



## Summary

Smokeless tobacco use is a significant part of the overall world tobacco problem. Much of the tobacco in the world is consumed without combustion (without burning). Rather, it is placed in contact with mucous membranes in the mouth or nose, through which nicotine is absorbed into the body.

A number of studies have indicated that initiation of smokeless tobacco use occurs young. This early initiation age means that there is opportunity for sustained exposure to the negative health effects of smokeless tobacco use. Thus, early initiation is a serious public health issue.

A number of serious health problems are related to using smokeless tobacco:

- cancer of the mouth (including the lip, tongue, inner cheek, and floor and roof of the mouth) and throat
- leukoplakia (white, leathery, pre-cancerous patches that may develop where tobacco is held in the mouth, such as the cheeks, gums or tongue, and may become cancerous)
- gum and tooth disease, including cavities, lost teeth and painful sores
- gum recession (the gums pulling away from the teeth), loss of bone in the jaw, tooth abrasion (worn spots on the teeth), yellowing of teeth and chronic bad breath

Smokeless tobacco also affects the cardiovascular system and may be associated with heart disease, high blood pressure and stroke. Use of smokeless tobacco does not improve, and may decrease, athletic performance. Smokeless tobacco users are also more likely than non-users to behave in other ways that are harmful to their health.

With over 3,000 chemicals,<sup>7</sup> including 28 known carcinogens (cancer-causing agents), smokeless tobacco is a harmful tobacco product. In weighing the available evidence, AADAC endorses the position that smokeless tobacco is an unsafe product and, therefore, its use will not be promoted as a harm reduction strategy in Alberta.

Smokeless tobacco cessation methods should target specific populations to ensure greater success, such as male youth and young adults, athletes (both male and female), youth using one or more tobacco products, and Aboriginal populations.

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# ECONOMICS OF TOBACCO USE

## Quick Facts

- Taxation is an effective method of reducing tobacco consumption, especially among youth and low-income smokers.<sup>1,2</sup>
- The World Bank estimates that a 10% increase in the price of cigarettes worldwide would cause 40 million smokers to quit and prevent 10 million tobacco-related deaths.<sup>3</sup>
- In a 2005 public opinion survey, 64% of Albertans supported higher tobacco taxes as a means to prevent youth smoking.<sup>4</sup>
- In 2002, tobacco use was estimated to cost the Alberta economy \$1.8 billion, which included \$470.6 million in direct health-care costs.<sup>5</sup>
- The cost of tobacco use in Alberta due to loss of productivity in the workplace was estimated to be approximately \$1.3 million in 2002.<sup>5</sup>
- Fire damage due to smoking cost Albertans \$46 million in property damage, and led to 40 deaths and over 280 injuries in 2003.<sup>6</sup>
- In Alberta, a pack-a-day smoker spends \$3,984 on cigarettes each year, based on an average cost of \$10.91 per pack.
- In April 2007, Alberta's cigarette tax was \$37.00 per carton of 200 cigarettes, seventh highest among the provinces and territories.<sup>7</sup>
- In 2006, legislation was passed that allowed retailers to only sell tobacco marked for sale in Alberta. Tobacco intended for sale in other provinces cannot be sold in Alberta.<sup>8</sup>





## ECONOMICS OF TOBACCO USE

It is important to understand the economic issues related to tobacco use. Tobacco taxation is at the forefront of most tobacco-related discussions because tobacco taxes can reduce the consumption of tobacco while generating government revenue. Tobacco imposes a financial burden on society; thus, the costs of tobacco use are also of interest. This chapter also explores the tobacco industry's role in the production, sale, and smuggling of tobacco.

### Tobacco Taxation

***An increase in tobacco taxes, and consequently an increase in the price of cigarettes, leads to a decrease in cigarette consumption.***<sup>1</sup>

Governments have many economic options available to curb the use of tobacco. One of the most effective options is increasing tobacco taxes. An increase in tobacco taxes results in an increase in cigarette prices. Increasing tobacco prices leads to lower cigarette consumption and fewer smoking-related deaths.<sup>1, 3, 9-11</sup> Tobacco taxes reduce cigarette consumption by<sup>1, 3</sup>

- lowering consumption among current smokers
- encouraging some people to quit
- preventing others from starting to smoke
- lowering the number of ex-smokers who resume smoking

Studies of high-income countries, such as Canada, show that increasing the price of a pack of cigarettes by 10% lowers the consumption of cigarettes by approximately 3% to 5%.<sup>1, 13, 14</sup> The relationship between a price increase in tobacco and the subsequent decrease in tobacco consumption has been demonstrated nationally and provincially. In Canada, for instance, the tobacco tax increased from an average of \$0.46 in 1980 to \$3.72 in 1991. As Canada's tobacco tax increased<sup>15</sup>

- cigarette sales fell 39%
- tobacco consumption decreased 30% faster than in the United States (where tobacco taxes are much lower)
- smoking by teenagers was cut by two-thirds

In Alberta, between 1985 and 1995, the price of cigarettes increased by 78%; during the same time period, per capita consumption decreased by 43%.<sup>16</sup> In March of 2002, Alberta implemented a \$2.25 tobacco tax increase per pack of 25 cigarettes; and in 2003, cigarette sales had decreased by 897 million from 2001 (the last full year of sales data before the tobacco tax increase). Although it is difficult to determine whether

The World Bank estimates that a 10% increase in the price of cigarettes worldwide would cause 40 million smokers to quit and prevent 10 million tobacco-related deaths.<sup>12</sup>

this was a direct effect of the increased tobacco tax, this was the greatest decrease in tobacco sales over any two-year period in Alberta since 1982 to 1984.<sup>17</sup>

***Low-income smokers are sensitive to price increases in tobacco.***<sup>1, 18</sup>

A 10% increase in tax may produce a 6% to 10% reduction in consumption among low- and middle-income smokers.<sup>1, 14, 19</sup> Low- and middle-income smokers spend a higher proportion of their total income on tobacco, and as a result are more responsive to tobacco taxation than high-income smokers.<sup>20</sup>

***Adolescents and young adults are affected more than adults by price increases in tobacco.***<sup>1</sup>

Research indicates that adolescents and young adults are two to three times more sensitive to the price of cigarettes than adults are.<sup>1, 21</sup> This may be because they have less disposable income or may not be as heavily addicted to nicotine.<sup>13</sup> Although increased taxation may contribute to a reduction in youth smoking, 71% of youth in grades 7 to 12 in Alberta reported that, if they wanted to, they could easily access cigarettes.<sup>22</sup> Part of the reason youth feel it is easy to obtain cigarettes is that they get most of their cigarettes from social sources, rather than commercial (retail) sources. Youth access restrictions are also important in preventing and reducing youth smoking.

(For more on youth access to tobacco products, refer to the Youth and Smoking chapter.)

A 2005 public awareness campaign gauged Albertan support for increasing tobacco taxes as a method to prevent young people from smoking. The results showed that 64% of adults and 76% of youth supported a tobacco increase as a method to reduce youth smoking.<sup>4</sup>

## **Tax rates**

### ***Canada***

In higher-income countries, packs of cigarettes are taxed at approximately two-thirds of the retail price.<sup>23</sup> In Canada, tobacco taxes vary from province to province. Generally, the federal and provincial governments set the tax rate of cigarettes at about 55% to 75% of the retail cost.<sup>23</sup> Table 1 shows the tobacco taxes paid by province (including sales taxes) per carton of 200 cigarettes as of April 20, 2007.<sup>7</sup> This table also provides tobacco tax rates on “roll-your-own” cigarettes. Roll-your-own cigarette products can be rolled with “expanded” tobacco. Hence, a cigarette can be made using less tobacco; in fact, 100 grams of expanded tobacco is enough to roll 200 cigarettes. Because of the low rate of tobacco taxation on roll-your-own cigarettes, it has been suggested that 0.5 grams of roll-your-own be taxed at the same rate as one whole cigarette.<sup>7</sup>

Research suggests that increases in the price of smokeless tobacco would reduce the prevalence of smokeless tobacco use.<sup>1</sup>

In Canada, from 1979 to 1991, the price of cigarettes increased by 159% and teenage smoking dropped from 42% to 16%. In 1994, Canada lowered tobacco taxation because of concerns related to smuggling. The decrease in tobacco taxes resulted in a lower price for cigarettes and there was a corresponding increase in teenage smoking prevalence, from 16% to 20%. Additionally, the federal and provincial government experienced a combined loss of \$1.2 billion in tax revenue.<sup>53</sup>

Table 1. Comparative federal, provincial and territorial tobacco tax rates, April 20, 2007

	200 cigarettes	200 roll-your-own cigarettes (100 grams)
Nunavut	\$42.00	\$14.00
N.W.T.	\$42.00	\$13.60
Newfoundland and Labrador	\$40.96	\$33.73
Saskatchewan	\$40.35	\$19.93
Manitoba	\$40.15	\$18.70
Nova Scotia	\$38.75	\$16.26
Alberta	\$37.00	\$18.50
British Columbia	\$35.80	\$17.90
Prince Edward Island	\$34.90	\$14.00
New Brunswick	\$28.47	\$10.32
Yukon	\$26.40	\$4.68
Ontario	\$24.70	\$12.35
Quebec	\$20.60	\$10.30
Federal	Approximately \$20.00	Approximately \$7.30

Note: When comparing provinces in terms of total tobacco taxes paid, sales taxes (e.g., Goods and Service Tax/Harmonized Sales Tax, Provincial Sales Tax) should be included in the calculation. These sales taxes are included in the rates provided in the table.

Source: Alberta tax increase – provincial/territorial tax tables (April 20, 2007)<sup>7</sup>

### **Alberta**

In March 2002, the Alberta government implemented the largest single tobacco tax increase in Canadian history. This included a tax increase of \$2.25 per pack of 25 cigarettes. Taxes on cigars also increased from 80% to 183% of the cigar retail price. In August 2003, the government of Alberta reduced the cigar tax rate to 95% of the retail price, to bring it back in line with rates in neighbouring provinces.<sup>24, 25</sup> On April 20, 2007, Alberta increased taxes on cigarettes by \$5.00 per carton of 200 cigarettes, bringing the total tobacco taxes to \$37.00 per carton of 200 cigarettes. With this tax increase, Alberta's cigarette tax ranked seventh among all provinces and territories (see Table 1).<sup>7</sup> The taxes on various forms of tobacco are as follows:<sup>26</sup>

#### **Cigarettes and tobacco sticks**

- 18.5 cents for each cigarette
- 18.5 cents for each tobacco stick

#### **Tobacco**

- Fine cut: 18.5 cents for any gram or portion of a gram
- Pipe: 18.5 cents for any gram or portion of a gram
- Chewing tobacco, snuff: 18.5 cents for any gram or portion of a gram



## Cigars

- 95% of the taxable price of the cigar
- The minimum tax is \$0.175 and the maximum tax is \$5.80 per cigar

### Government revenue from tobacco

Federal and provincial tobacco tax revenue amounted to \$7.1 billion in 2005/2006.<sup>28</sup> In Alberta, government revenue from tobacco tax was relatively stable from fiscal years 1991/1992 to 2001/2002. This was also a period when tobacco taxes were relatively stable. Following the tax increase in March 2002, government revenues from tobacco increased 65% from 2002/2003 and continued to gradually rise through to 2006 (see Figure 1).<sup>29, 30</sup> In Alberta, tobacco tax is expected to generate \$890 million in revenue in 2007/2008.

An Indian or a member of an Indian Band, as defined by the Indian Act, over the age of 18 who purchases tobacco products on Indian reserves in Alberta is exempt from tobacco taxation. The retailer must be registered with Alberta Finance, Tax and Revenue Administration (TRA) to sell the products tax-exempt, and the consumer must present an Alberta Indian Tax Exemption card at the time of purchase.<sup>27</sup>

Figure 1. Alberta provincial government revenues from tobacco tax 1994 to 2008



\* based on estimate from Alberta Finance

Sources: For revenue amounts from 1997/1998 to 2000/2001: Tax Revenues from Tobacco Sales. Provincial and Federal Tobacco Tax Revenues (2003)<sup>29</sup>

For amounts from 2001/2002 to 2006/2007: Annual reports from 2001/2002 through 2005/2006 (2007)<sup>30</sup>

For amounts from 2007/2008: Tobacco tax overview (2007)<sup>31</sup>

## Economic Costs of Tobacco Use

***In 2002, the costs associated with smoking in Canada were approximately \$17 billion. The costs associated with smoking in Alberta were approximately \$1.8 billion.***

Tobacco imposes enormous costs across the world. By 2010, global costs of tobacco are estimated to be US \$500 billion a year<sup>54</sup> These costs are incurred by governments, health-care systems, employers, non-smokers and smokers, to name a few. Though most of these costs are borne by the public sector, most of the profits from tobacco remain within the private sector.

Table 2. Examples of types of costs associated with tobacco use

Direct costs	Indirect costs
• health care (e.g. hospital, physician, ambulance, prescription drugs, long term care, external effects on non-smokers)	• productivity losses in the workplace or at home because of sickness and death
• workplace losses (e.g., health programs, drug testing)	• pain and suffering of smoker and family
• prevention and research for tobacco cessation	• litter/waste
• fire damage costs	
• tobacco subsidies	
• insurance premium costs	

### Canada

In 2002, a study was conducted on the costs of substance abuse in Canada. The study estimated that smoking accounted for the largest proportion (43%) of all substance abuse related costs in Canada, more than alcohol or illicit drugs. It was estimated that the costs associated with smoking in Canada were approximately \$17 billion (see Table 3). The largest economic cost related to tobacco use was loss of productivity, followed by direct health-care costs.<sup>32</sup>

Table 3. The cost of tobacco use in Canada, 2002 (millions)

Cost	Canada
Direct health-care costs	\$4,360.2
Direct losses associated with the workplace	\$0.5
Direct costs for prevention and research	\$78.1
Direct costs associated with fire damage	\$86.5
Indirect costs: productivity losses (because of death or illness)	\$12,470.9
Total	\$16,996.2

Source: The Costs of Substance Abuse in Canada 2002: Highlights (2006)<sup>32</sup>

### Alberta

It was estimated that tobacco use cost Alberta \$1.8 billion in 2002.<sup>32</sup> Tobacco use is responsible for substantial economic costs to the province in terms of health-care expenditures, lost productivity, fires and property damage.<sup>33</sup>

Table 4. The cost of tobacco use in Alberta (millions)

Cost	2002
Direct health-care costs	\$470.6
Indirect costs: productivity losses (because of death or illness)	\$1,296.0
Direct costs associated with fire damage	not reported
Direct costs for prevention and research	\$7.7
Direct losses associated with the workplace	not reported
Other direct costs	8.6
Total	\$1,782.9

Source: National release of the Costs of Substance Abuse in Canada 2002 study: Alberta fact sheet (2006)<sup>33</sup>

### ***Costs from fire***

In 2004, the Alberta Fire Commissioner's Office reported 182 residential fires ignited by smoking, and an estimated \$8.9 million in related losses. This is an increase from 2003, when 176 fires were reported as caused by smoking and related losses were estimated at \$5.8 million.<sup>34</sup> In 2005, the federal government implemented regulations on cigarette ignition propensity to regulate the rate at which cigarettes burn, in an effort to prevent fires ignited by burning cigarettes.<sup>35</sup>

### **Economic costs to employers**

The Conference Board of Canada is an independent, not-for-profit research organization. In 2006, the Conference Board of Canada estimated that employing a smoker cost about \$3,396 more per year than employing a non-smoker, up from \$2,565 in 1997.<sup>37</sup> Additionally, the report indicated that there appears to be greater recognition of the impact of smoking in the workplace as reflected by an increase in employee assistance programs and smoking bans.

Table 5. The annual cost of employing smokers (per employee)

Cost factor	Cost 1997	Cost 2006
Increased absenteeism	\$230	\$323
Decreased productivity	\$2,175	\$3,053
Increased life insurance premiums	\$75	\$0
Smoking area costs	\$85	\$20
Total	\$2,565	\$3,396

Source: Smoking and the bottom line: The costs of smoking in the workplace (1997 & 2006)<sup>37</sup>

### **Economic costs to smokers**

#### ***Smokers pay enormous economic costs.***

Smokers pay higher life insurance premiums and, as a group, shoulder billions of dollars in taxes.<sup>39</sup> Smoking is also associated with the costs of physical damage (e.g., clothing and furniture), other financial costs

Tobacco use also imposes costs on the environment. Globally, more than 1.6 million cigarette butts were collected from shores across the world. Cigarette litter alone accounted for 34% of the trash collected along the world's coasts. Tobacco farms also use agricultural land that could otherwise be used to grow food.<sup>36</sup>

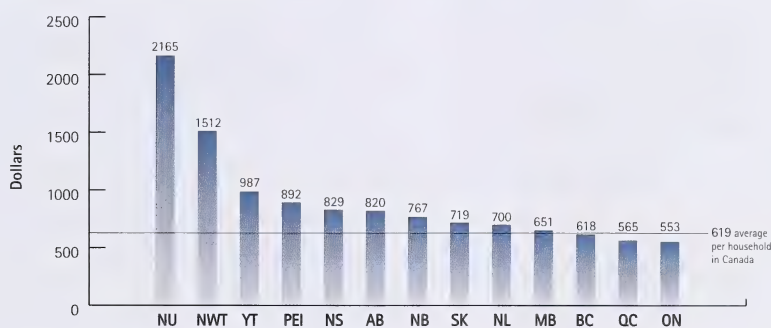
A 2002 study of substance use in the workplace showed that employee tobacco use was a key concern of employers in their organization of industry. In particular, 19% of employers reported employee tobacco use to be associated with arriving late for work and taking too many breaks to smoke.<sup>38</sup>

(e.g., job opportunities restricted to non-smokers, job loss caused by health issues) and human costs (e.g., potential mates and residences restricted to non-smokers).<sup>39</sup>

The most direct economic cost to smokers is the cost of cigarettes themselves. In Alberta, a smoker who smokes one pack a day spends more than \$3,984 each year on cigarettes, based on an average price of \$10.91 per pack. This money is also unavailable to be used in other areas that may be more beneficial for smokers and their families. This is particularly a concern among lower-income smokers.<sup>40</sup>

On average, Albertans spend more than Canadians per household on tobacco products and smokers' supplies. In 2005, Canadians spent an average of \$619 and Albertans spent an average of \$820 per household on tobacco products and smokers' supplies.<sup>41</sup> This was a decrease from the amount per household Albertans spent in 2003 (\$899) and 2004 (\$850). Alberta is the third highest province in average spending on tobacco products and smoker's supplies (see Figure 2).

Figure 2. Average expenditure per household on tobacco products and smokers' supplies by province and territory, 2005



Source: Spending Patterns in Canada (2005)<sup>41</sup>

## Reducing Costs

***Costs associated with tobacco use can be reduced by decreasing tobacco consumption, implementing smoking restrictions, and recovering costs by means of litigation.***

### Decrease consumption

In 1999, the Canadian Council for Tobacco Control estimated that, overall, a 1% reduction in smoking prevalence amounted to a national cost savings of \$65.7 million. These estimates accounted for direct health-care costs such as hospitals, physicians and research, but did not include indirect costs such as productivity losses, suggesting it is a lower estimate of deferred costs. The following table shows the cost avoidance estimates for specific tobacco-related diseases.<sup>42</sup>



Table 6. Cost avoidance from smoking reduction in Canada (1999)

Disease	Decrease in the number of cases because of a 1% drop in smoking rates	Avoidance in health-care costs (millions of dollars)
Cancer of the mouth	62	\$1.8
Lung cancer	98	\$2.3
Heart disease	2,835	\$26.0
Cerebrovascular disease	592	\$19.5
Chronic obstructive pulmonary disease (COPD)	1,263	\$16.1
Total cost avoidance in 1999		\$65.7

Source: Impact of anti-tobacco campaign on direct health care costs in Canada (2002)<sup>42</sup>

### Smoking restrictions

In addition to reducing consumption, smoking restrictions can be implemented to reduce the costs associated with smoking. Smoking restrictions serve to reduce costs in a number of ways. For instance, smoking restrictions reduce exposure to second-hand smoke, hence reducing tobacco-related illness and death caused by such exposure. For employers, smoking restrictions can result in lower insurance premiums, less absenteeism, and a reduction in accidental fires.<sup>36</sup> There has been concern about the financial impact of banning smoking in restaurants; however, research indicates that such a ban does not have a long-term financial impact.<sup>43</sup>

(For more on smoking restrictions, refer to the Second-Hand Smoke chapter).

### Cost recovery

Globally, litigation against tobacco companies is a growing trend.<sup>36</sup> Lawsuits against tobacco companies can result in medical cost reimbursement, and individual and government compensation. Additionally, litigation against the tobacco industry can force the tobacco industry to disclose documents, publicize the wrongful acts committed by tobacco companies, encourage tobacco companies to change their behaviour and promote legislative action to increase tobacco control regulation. In 1998, the Province of British Columbia launched a lawsuit against the tobacco industry to recover tobacco-related health-care costs incurred by the province. The Supreme Court of Canada unanimously upheld this unprecedented lawsuit in September 2005. The lawsuit contends that tobacco manufacturers<sup>44</sup>

- marketed “light” cigarettes as safer when they knew they were not
- targeted children in their advertising and marketing
- conspired to suppress research on the risks of smoking
- conspired to invalidate the public warnings on the risks of smoking
- are responsible for health-care costs associated with smoking

## The Tobacco Industry

China is the world's largest tobacco manufacturer and accounts for 35% of global tobacco production.<sup>45</sup>

### Tobacco production

Globally, more than 120 countries grow tobacco on more than four million hectares of agricultural land.<sup>36</sup> The share of the world's tobacco production is decreasing among developed countries and increasing among developing countries.<sup>45</sup> Between 1970 and 2000, the portion of tobacco produced in developed countries decreased by approximately 25%.<sup>45</sup> Within Canada, a decrease in the production of tobacco is also evident.<sup>46</sup> In 1970, Canada produced 100,635 metric tons of tobacco leaf and 50.2 billion cigarette sticks. In 2000, Canada produced 53,010 metric tons of tobacco leaf and 45.2 billion cigarette sticks.

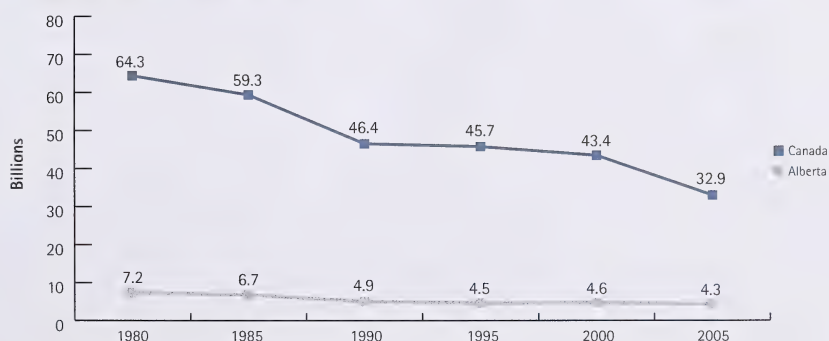
Three manufacturers account for more than 98% of domestic cigarettes sales throughout Canada. Imperial Tobacco Canada Limited holds close to 70% of the market share. The next largest tobacco producers within Canada are Rothmans, Benson & Hedges Incorporated, which accounts for approximately 17%, and JTI-Macdonald Corporation, which accounts for approximately 12% of the Canadian tobacco market.<sup>47</sup>

### Tobacco sales

Approximately 40,000 retailers sell between 40 and 50 billion cigarettes nationally each year.<sup>47</sup> These retailers include grocers, supermarkets, convenience stores, independent shops, drugstores and gas stations. It has been estimated that Canadian retailers' annual revenue is \$700 million and wholesalers' annual revenue is \$140 million, nationally.<sup>48</sup>

The number of cigarettes sold in Canada and in Alberta gradually decreased between 1980 and 2005 (see Figure 3). In 2004 and 2005, however, there was a slight increase in tobacco sales in Alberta. In 2005, Alberta's tobacco sales were the third highest of all provinces and territories (after Ontario and Quebec).<sup>17</sup>

Figure 3. Domestic and imported cigarette sales in Canada and Alberta, 1980, 1985, 1990, 1995, 2000, 2005 (billions of dollars)



Source: Wholesale Sales Data (2006)<sup>17</sup>

A substantial proportion of tobacco sold in Alberta is sold in the form of discount products. In 2006, Rothman's, Benson & Hedges reported that their "price category" cigarettes (e.g., Number 7, Canadian Classic and Mark Ten) accounted for 55.2% of their total sales.<sup>49</sup> Imperial Tobacco reported that in July 2005 the average retail price of a carton of premium cigarettes was \$77.13 and the average price of a carton of "value for money" cigarettes was \$63.34.<sup>50</sup>

## Tobacco advertising in retail stores

Tobacco manufacturers pay retailers to promote and display tobacco products where purchases are made. Nationally, tobacco manufacturer payments to retailers to display tobacco products and signs have increased by 45% between 2001 and 2006. In 2006, a total of \$107 million in promotional payments were made in Canada. Provincially, promotion payments have increased by 63% between 2001 and 2006. In 2006, tobacco manufacturers paid Alberta retailers nearly \$12 million in promotional payments, the third highest amount paid to any of the provinces or territories.<sup>51</sup>

(For more on tobacco advertising and youth, see the Youth and Smoking chapter.)

In April 2007, legislation was proposed that, if passed in its proposed form, would include<sup>52</sup>

- a ban on retail displays (applicable to all stores, not just those accessible to minors)
- a ban on tobacco sales in hospitals and other health facilities, pharmacies and stores that contain a pharmacy, and colleges and universities

## Tobacco smuggling

***There are two forms of smuggling tobacco products: bootlegging and organized smuggling.***

Generally, bootlegging occurs when tobacco products are purchased in a country or province at a lower price and then resold illegally in an area where the cost of tobacco is higher.<sup>53</sup> Bootlegging typically involves smaller amounts of tobacco products that are smuggled over a shorter distance. This form of smuggling is more common in areas where substantial price differences between neighbouring countries or provinces exist.

Organized smuggling is also an effort to obtain cigarettes at a lower price and then resell in another location where the prices are higher. However, an additional element to organized smuggling is that there is an attempt to evade excise taxes, duties or tariffs between countries and states. Avoiding these taxes may result in millions of dollars in profits.

According to the American Cancer Society,<sup>54</sup> tobacco companies benefit from smuggling for the following reasons:

- *There is no financial loss to the industry, whereas governments lose tax revenue.*
- *Flooding the market with cheap cigarettes makes them more affordable to youth and encourages new smokers.*
- *The availability of smuggled cigarettes raises brand profile and promotes brand loyalty.*
- *Tobacco companies can use the “smuggling argument” to dissuade governments from raising tobacco taxes.*
- *Tobacco companies gain access to markets closed to legitimate imports.*

Several tobacco companies have been implicated in organized smuggling in several countries.<sup>53</sup> Corporate documents demonstrate that some tobacco companies identify illicit trade as a competitive market.<sup>55</sup>

Nationally and provincially, there are several strategies in place to reduce smuggling. Numerous federal and provincial statutes, regulations and monitoring bodies exist to control tobacco products. Federally, the Tobacco Act regulates the production, distribution, labelling and promotion of tobacco.<sup>56</sup> Tobacco Reporting Regulations require tobacco manufacturers and importers to provide detailed reports to the minister of health on a regular basis. Within Alberta, wholesalers must be licensed to resell tobacco products. An additional licence is required to sell tax-exempt tobacco products under the Alberta Indian Tax Exemption program or at a duty-free shop. Additionally, all tobacco products intended for tax-paid sale in Alberta must show an Alberta tobacco mark.

The American Cancer Society<sup>54</sup> provides the following suggestions on how to reduce smuggling:

- *Monitor cigarette routes.*
- *Use technologically sophisticated “tax paid” markings on tobacco products identifying point of origin and destination.*
- *Print unique serial numbers on all packages of tobacco products.*
- *Increase penalties.*
- *Collaborate with other countries via [the] WHO Framework Convention on Tobacco Control and customs authorities.*

In 2005, the World Health Organization's Tobacco Free Initiative identified Canada as a world leader in the regulation of tobacco products.<sup>57</sup>



## Summary

Increasing the cost of tobacco use has been reported as an effective way of decreasing tobacco consumption; this is particularly true for youth and low-income people. One method of raising the price of tobacco products is increasing tobacco taxes.

The economic costs of tobacco use are substantial to Canadians and Albertans. Costs are wide and varied, from health-care costs to fire damage costs, from workplace losses to litter and waste. Though most of these costs are borne by the public sector, most of the profits from tobacco remain within the private sector.

There are different ways to reduce the costs of smoking. A decrease in tobacco consumption is perhaps the most straightforward method. A national reduction of smoking by 1% is estimated to save the Canadian economy \$65.7 million. Other ways to reduce the cost of smoking include implementing smoking restrictions and taking legal action against the tobacco industry to recover costs.

National trends reveal a decrease in production and sales of tobacco products. Tobacco retailers, however, continue to make substantial revenue despite a national decrease in tobacco sales.

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# TOBACCO ADDICTION

## Quick Facts

- The nicotine in tobacco causes physical addiction.<sup>8</sup>
- In a 2003 public awareness survey, 95% of Albertans somewhat or strongly agreed that tobacco is highly addictive.<sup>2</sup>
- 33% to 50% of people who experiment with cigarettes become regular users.<sup>3</sup>
- 70% to 90% of people who are regular users are addicted to nicotine.<sup>3</sup>
- Withdrawal symptoms include depression, insomnia, irritability, anxiety, difficulty concentrating, restlessness, decreased heart rate, increased appetite, weight gain and craving for nicotine.<sup>3</sup>
- Withdrawal symptoms peak 24 to 48 hours after cessation and can last from three days to four weeks, although the craving for a cigarette can last for months.<sup>4</sup>
- Relapse rates for quitters are high; about 60% relapse within three months, and 75% within six months.<sup>5</sup>
- Relapse is the rule, not the exception, and must be viewed as part of the cessation process.



## TOBACCO ADDICTION

It is clear that smoking is addictive; some people continue to use tobacco even when they wish they could stop. The nicotine in tobacco causes physical addiction; however, there are also psychosocial factors that come into play. It is evident that addiction is a very complex and highly individual experience. The harmful health effects of tobacco use are known by many Albertans. Not surprisingly, many smokers try to quit. According to 2006 CTUMS estimates, 48% of Canadian and 53% of Albertan smokers tried to quit at some point within the year preceding the survey.<sup>1</sup>

### Physical Aspects of Addiction

***Smoking is more than a habit. The nicotine in tobacco causes physical addiction.***<sup>8</sup>

Nicotine is considered addictive for the following reasons:

#### 1. It is psychoactive.

Nicotine is a drug that acts on the brain and affects mood and cognitive function.<sup>5</sup>

#### 2. People use it compulsively.

Daily smokers in Canada smoked an average of 15.5 cigarettes every day, and daily smokers in Alberta smoked an average of 15.9 cigarettes every day. Very few people are able to have a cigarette every now and then without progressing to regular smoking. Among current smokers in Canada in 2006, the majority of smokers were daily smokers (76%) as opposed to non-daily or occasional smokers. Similarly, the majority of smokers in Alberta were daily smokers (77%).<sup>1</sup>

#### 3. It is a “reinforcer.”

One of the indications that a drug is addictive is that it reinforces a cycle of drug-taking behaviour. Nicotine is a reinforcer because it causes many smokers to continue smoking to avoid the pain of withdrawal symptoms. Smokers also adjust their smoking behaviour (inhaling more deeply, for example) to maintain a particular level of nicotine in the body.<sup>5</sup>

### Psychosocial Aspects of Addiction

***Psychological and social factors also make smoking highly addictive.***

One of the most obvious reasons that smokers continue to smoke is that it gives them pleasure: the pleasure of handling the cigarette, the oral satisfaction of drawing on the cigarette, or the comfort of a quick fix

Definitions for findings from the Canadian Tobacco Use Monitoring Survey

A *current smoker* is a person who currently smokes cigarettes daily or occasionally.

A *daily smoker* is a person who currently smokes cigarettes every day.

A *non-daily (occasional) smoker* is a person who currently smokes cigarettes, but not every day.

A *non-smoker* is a person who currently does not smoke cigarettes.

A *former smoker* is a person who has smoked at least 100 cigarettes in their life, but currently does not smoke.

An *experimental smoker* is a person who has smoked at least one cigarette, but less than 100 cigarettes, and currently does not smoke cigarettes.

A *lifetime abstainer* is a person who has never smoked cigarettes at all.

An *ever smoker* is a person who is a current smoker or a former smoker.

A *never smoker* is a person who was an experimental smoker or who is a lifetime abstainer.



in times of boredom, frustration, anger or stress. Also, use of tobacco may be associated with and reinforced by other pleasurable feelings, such as those produced after eating a meal, while socializing, or after drinking alcohol.

If the pleasures of smoking and the craving for nicotine outweigh the negative consequences, smokers will be less motivated to quit. And, though smokers may experience a daily level of discomfort (such as having to go outdoors to smoke, experiencing smoker's cough, and having shortness of breath), the immediate consequences of smoking are not as severe as the long-term health consequences. Additionally, unlike harmful use of other substances (e.g., alcohol, heroin or cocaine), smoking does not put people in immediate danger of losing their jobs or families because of their addiction. It becomes easy, then, to put off quitting or to resume smoking after a cessation attempt.

## Addiction Rates

***Of the people who experiment with cigarettes, 33% to 50% become regular users. And 70% to 90% of people who are regular users are addicted.***<sup>3</sup>

Smoking is so addictive that many people continue to smoke even when their lives are in immediate danger. Studies have shown that

- 40% of those having their voice box removed (laryngectomy) continued to smoke afterwards<sup>4</sup>
- 38%<sup>3</sup> to 50%<sup>5, 6</sup> of smokers who have had a heart attack start smoking again while still in hospital, most within 48 hours of coming out of intensive care
- 25% of smokers admitted to a smoke-free hospital reported smoking during their hospital stay<sup>7</sup>

One measure of the degree of addiction to cigarettes is how soon smokers have their first cigarette after awakening. Table 1 shows Canadian and Albertan smokers' responses to the question, "How soon after you wake up do you smoke your first cigarette?" Over half of smokers in Canada and Alberta smoke their first cigarette within 30 minutes of waking.

Table 1. Time elapsed from awakening to smoking first cigarette, Canada and Alberta, CTUMS 2006

Time elapsed from awakening to first cigarette	Canada (%)	Alberta (%)
5 minutes	21	19
6 to 30 minutes	32	35
31 to 60 minutes	19	27
More than 60 minutes	26	18

Source: Canadian Tobacco Use Monitoring Survey (2006)<sup>1</sup>

## Quit Rates

### Canada

In Canada, there are more former smokers (27%) than current smokers (19%).<sup>1</sup>

According to the 2006 CTUMS, slightly less than half (49%) of Canadian smokers did not attempt to quit smoking in the 12 months before the survey. Approximately one-third of smokers (35%) made one to three attempts to quit smoking in the 12 months before the survey. Additionally, quit attempts among males and females were similar. Fifty-eight per cent of youth aged 15 to 19 made quit attempts, compared with 59% of those aged 20 to 24 and 45% of those aged 25 and older.<sup>1</sup>

According to data from the 2006 CTUMS, Canadian smokers who “recently” (less than a year ago) quit smoking (short-term quitters) or “successfully” quit smoking one year ago or more (long-term quitters) comprised 60% of all those who ever smoked.<sup>1</sup> In Canada, 76% of former smokers made three or fewer quit attempts before quitting smoking for good. An additional 16% of former smokers made between four and 10 quit attempts before quitting; hence, the majority (92%) of former smokers made between one and 10 quit attempts before quitting for good.<sup>1</sup>

Most smokers who quit did so for health reasons; 67% of former smokers in Canada who had quit within the year prior to the survey reported that health was their main reason for quitting.<sup>1</sup>

### Alberta

***The good news is that many Albertans, aged 15 years and older, have quit. There are now more former smokers (26%) than there are current smokers (21%) in Alberta.***<sup>1</sup>

According to the 2006 CTUMS, 44% of smokers in Alberta made no attempts to quit in the 12 months prior to the survey, whereas 53% of Albertans made at least one quit attempt. Forty per cent of smokers made one to three attempts to quit over this time period. Sixty-nine per cent of youth aged 15 to 19 made quit attempts, compared with 63% of those aged 20 to 24 and 51% of those aged 25 and older.<sup>1</sup>

Albertan smokers who “recently” (less than a year ago) quit smoking (short-term quitters) or “successfully” quit smoking one year ago or more (long-term quitters) comprised 55% of all those who ever smoked.<sup>13</sup> In Alberta, 77% of former smokers made one to three quit attempts before quitting smoking for good. An additional 15% of former smokers made between four and 10 quit attempts before quitting for good; hence, the majority (92%) of smokers made between one and 10 quit attempts before quitting for good.<sup>1</sup>

## Nicotine Withdrawal

According to the American Psychiatric Association, nicotine withdrawal can include any of the following symptoms: depression, insomnia, irritability, anxiety, difficulty concentrating, restlessness, decreased heart rate, increased appetite, weight gain and craving for nicotine.<sup>9</sup>

Withdrawal symptoms peak 24 to 48 hours after cessation and can last from three days up to four weeks, although the craving for a cigarette can last for months.<sup>5</sup> Smokers who typically smoke at least 15 cigarettes per day or who smoke their first cigarette of the day within 30 minutes of waking are likely to experience nicotine withdrawal symptoms and to find quitting uncomfortable.<sup>11</sup>

## Relapse

There is a high rate of smoking relapse (starting smoking again after quitting). The rate is, in fact, about the same for smoking as for using heroin and alcohol. About 60% of quitters relapse in three months, and 75% in six months.<sup>5</sup> Less than 5% of smokers who quit without the help of programs or therapies maintain continuous abstinence for one year or more.<sup>11</sup>

***Relapse can be an important opportunity for learning. What is viewed by some as failure can be a key part of the cessation process.***

If relapse is used constructively, it can become an effective tool, preparing the smoker for the next attempt. A smoker who has relapsed is in a good position to evaluate available cessation methods and decide what might work the next time. In fact, research suggests that smokers with a quitting history have a better chance of achieving abstinence in the next year or two.<sup>14</sup>

## Summary

The nicotine in tobacco causes physical addiction. In addition to the physical addiction, there are psychosocial factors that contribute to addiction to tobacco. Addiction to tobacco, therefore, is a complex experience for many smokers.

Of those who experiment with cigarettes, anywhere from a third to half become regular users, and most regular users become addicted to smoking. More than half of Canadians and Albertans try to quit smoking, but relapse rates are high. Relapse should be viewed as part of the process of quitting.



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# CESSATION OF TOBACCO USE

## Quick Facts

- The U.S. Public Health Service (PHS) developed a Clinical Practice Guideline in 2000 for public health professionals. The guide contains the best evidence-based information about treatment effectiveness in smoking cessation.
- Once smokers are screened, health professionals can use the 5 A's intervention strategy suggested in the PHS guideline:<sup>1</sup>
  1. **ASK** smokers about their smoking habit.
  2. **ADVISE** smokers to quit.
  3. **ASSESS** smokers' motivation and readiness to quit. If they are not ready to quit motivate them to consider cessation with specific behavioural skills and pharmacological aids.
  4. **ASSIST** smokers by telling them how to quit if they are ready.
  5. **ARRANGE** follow-up care with smokers to prevent relapse. If smokers do relapse, they can be cycled back into treatment, and a new treatment plan can be developed. Thus, treatment does not end until the smoker can maintain a tobacco-free life.
- Drug therapy is one of the most effective tobacco cessation methods.<sup>2,3</sup>
- Utilization of a telephone quitline is an effective cessation strategy, one that is growing in popularity largely because of an increase in evidence-based support, improved cost-effectiveness, and accessibility.<sup>1, 4-13</sup>

- Incorporating oral assessments and behavioural interventions in dental practices may increase smokeless tobacco cessation rates.<sup>14</sup>
- Many youth want and try to quit smoking but meet with limited success. Interventions tailored for youth need to be further evaluated and developed. There are established guidelines to assist such an effort.<sup>15</sup>
- Quitting smoking during a cessation attempt for another substance does not jeopardize sobriety from other substances. In some cases, quitting smoking can improve sobriety from other substances.<sup>16-21</sup>

## Definitions

(Note: These definitions are taken from the Canadian Tobacco Use Monitoring Survey)

A *former smoker* is a person who has smoked at least 100 cigarettes in his or her lifetime, but currently does not smoke.

A *current smoker* is a person who currently smokes cigarettes daily or occasionally.

A *daily smoker* is a person who currently smokes cigarettes every day.

A *non-daily (occasional) smoker* is a person who currently smokes cigarettes, but not every day.

## TOBACCO CESSATION METHODS

There are many different tobacco cessation methods, and some are more effective than others. This chapter describes some of the best practices and methods for smoking cessation and provides information on the effectiveness of these methods. Also explored are factors affecting smoking cessation, smoking cessation among people with co-addictions, smoking cessation among people with mental health problems, and smokeless tobacco cessation. (For information on the concept of addiction, quit rates and relapse rates, refer to the chapter Tobacco Addiction.)

Results from a 2006 longitudinal study that followed a group of smokers for 13 years indicated that pairing tobacco-control policies with well-funded tobacco-control programming can be effective in increasing cessation rates.<sup>22</sup>

### Guidelines for Health Professionals

In 2000, the Public Health Service (PHS) of the U.S. Department of Health and Human Services published *Treating Tobacco Use and Dependence: A Clinical Practice Guideline*. The PHS Clinical Practice Guideline contains evidence-based information about treatment effectiveness and was developed for primary care physicians. The PHS model for treatment of tobacco addiction emphasized the need for reaching smokers, and stressed the importance of physicians determining the tobacco use status of every patient, and of offering at least minimal intervention to every user.<sup>1, 23, 24</sup>

Once smokers are identified, health professionals can use the 5 A's intervention strategy suggested in the PHS guideline:<sup>1</sup>

1. **ASK** smokers about their smoking habit.
2. **ADVISE** smokers to quit.
3. **ASSESS** smokers' motivation and readiness to quit. If they are not ready to quit, motivate them to consider cessation with specific behavioural skills and pharmacological aids.
4. **ASSIST** smokers by telling them how to quit if they are ready.
5. **ARRANGE** follow-up care with smokers to prevent relapse. If smokers do relapse, they can be cycled back into treatment, and a new treatment plan can be developed. Thus, treatment does not end until the smoker can maintain a tobacco-free life.

While the guideline documents the various drug therapies available, it also emphasizes the importance of social support and skills training in cessation efforts.<sup>23</sup>



## Major findings and recommendations of the PHS Smoking Cessation Clinical Practice Guideline (pp. iii-v)<sup>1</sup>

1. *Tobacco dependence is a chronic condition that often requires repeated intervention. However, effective treatments exist that can produce long-term or even permanent abstinence.*
2. *Because effective tobacco dependence treatments are available, every patient who uses tobacco should be offered at least one of these treatments.*
  - *Patients willing to try to quit tobacco use should be provided with effective treatments such as the use of the 5 A's approach.*
  - *Patients unwilling to try to quit tobacco use should receive a brief intervention designed to increase their motivation to quit.*
3. *It is essential that clinicians and health-care delivery systems consistently identify, document and treat every tobacco user seen in a health-care setting.*
4. *Brief tobacco dependence treatment is effective, and every patient who uses tobacco should be offered at least brief treatment.*
5. *There is a strong dose-response relationship between the intensity of tobacco dependence counselling and its effectiveness. Treatments involving person-to-person contact (via individual, group or proactive telephone counselling) are consistently effective, and their effectiveness increases with treatment intensity (that is, the number of minutes of contact).*
6. *Three types of counselling and behavioural therapies were found to be especially effective and should be used with all patients attempting tobacco cessation:*
  - *provision of practical counselling (problem-solving and skills training)*
  - *provision of social support as part of treatment (intra-treatment social support)*
  - *help in securing social support outside of treatment (extra-treatment social support)*

7. Numerous effective pharmacotherapies for smoking cessation now exist. Except in the presence of contraindications, these should be used with all patients attempting to quit smoking.

- Five first-line pharmacotherapies have been identified that reliably increase long-term smoking abstinence rates:
  - bupropion SR
  - nicotine gum
  - nicotine inhaler
  - nicotine nasal spray
  - nicotine patch
- Two second-line pharmacotherapies have been identified as effective and may be considered by clinicians if first-line pharmacotherapies are not effective:
  - clonidine
  - nortriptyline
- Over-the-counter nicotine patches are effective relative to placebo, and their use should be encouraged.

8. Tobacco dependence treatments are both clinically effective and cost-effective relative to other medical and disease prevention interventions.<sup>1</sup>

## Smoking Cessation Methods

A wide range of cessation methods is available in Alberta to help smokers cope with the physical and psychological symptoms of withdrawal, and to support the process of long-term change. Smoking cessation methods include drug therapies, counselling and formal support programs, self-help programs or products, and a variety of alternative therapies. Several methods are often used together to increase the smoker's chances of success. Shown in Table 1 are cessation methods that were used by Albertans.

Table 1. Quit methods used by Alberta smokers who tried to quit or quit smoking\*

Method	Percentage of respondents who used the method
Nicotine patch	31%
Nicotine gum	22%
A product like Zyban	22%
Made a deal with a friend or family	30%
Reduced the number of cigarettes as a strategy to quit	63%

Source: Statistics Canada, Canadian Tobacco Use Monitoring Survey, 2006<sup>94</sup>

\*respondents were current and former smokers who had tried to quit or quit smoking in the two years preceding the survey.

## 1. Drug therapies

***Drug therapies are effective tobacco cessation methods that can be enhanced when used in conjunction with support programs (e.g., telephone quitlines) and counselling.***

Drug therapies that are used to reduce cravings and increase successful tobacco cessation include nicotine replacement therapies (nicotine gum, patch, nasal spray, inhaler and lozenges) and bupropion. Use of these drug therapies can double or even triple quit rates.<sup>3</sup>

### **Nicotine replacement therapies**

(Common NRTs are nicotine gum such as Nicorette® and Nicorette Plus®, and nicotine patches such as Nicotrol®, Nicoderm Patch® and Habitrol.®)

Nicotine replacement therapies (NRTs) are designed to break the smoking cycle, cut exposure to carcinogens and other chemicals in cigarettes, and ease withdrawal. They are used until initial withdrawal symptoms have lessened and until smokers feel more confident in their ability to quit.<sup>25</sup> There are several forms of NRTs. Nicotine chewing gum and the nicotine patch are the most common; nasal spray and inhalers are also available. Both the gum and the patch temporarily provide smokers with a lower, more gradual dose of nicotine to help reduce the severity of withdrawal symptoms. Both products provide smokers with one-third to half of their normal nicotine intake.<sup>25</sup>

NRTs have been proven to double the chances of long-term cessation independent of other support or settings; however, success rates increase when NRTs are used in combination with well-developed support or behaviour modification programs.<sup>2, 3</sup>

The main drawback to using NRT products is that some smokers will continue to experience withdrawal symptoms, because NRTs offer slower and lower doses of nicotine than do cigarettes. (Cigarettes offer high levels of nicotine seven seconds after inhaling.)<sup>25</sup>

### **Nicotine-free pill**

(Zyban® or bupropion hydrochloride)

Zyban is a prescription drug that helps to suppress withdrawal symptoms and reduce the weight gain associated with smoking cessation.<sup>27</sup> Zyban is a weak inhibitor of the neuronal uptake of norepinephrine and dopamine (chemicals in the brain that are affected by nicotine).<sup>28</sup> Zyban comes in the form of time-released tablets. Treatment begins one week before the quit date and continues for seven to 12 weeks.

Studies show that Zyban doubles the rate of cessation, and combining Zyban with a nicotine replacement therapy may produce even better

Since nicotine replacement therapies (NRTs) such as the patch and gum became available in Canada without a prescription, they have become an important part of self-help strategies.

### **Differences between the gum and the patch**

These are the primary differences between nicotine chewing gum and the nicotine patch:<sup>25, 26</sup>

- *The speed at which they deliver nicotine to the brain:* the gum delivers a faster boost of nicotine, 20 to 30 minutes after each dose; the patch offers a steady release over a longer period (it's worn 16 to 24 hours a day).
- *The ease of use:* the gum requires more instruction and is more complicated to use than the patch.
- *The degree to which smokers can regulate the dose themselves:* the gum can be regulated by the smoker, whereas the patch offers a consistent dose.
- *Side effects:* the gum can cause mouth and stomach irritation; the patch can cause skin irritation, insomnia and nightmares.



Champix,<sup>®</sup> or varenicline, is a medication that is approved by Health Canada as an effective smoking cessation treatment in combination with smoking cessation counselling. Champix works as a partial nicotinic receptor antagonist. That is, it imitates the effect of nicotine on the brain, which decreases cravings and withdrawal symptoms. Furthermore, if a person smokes while taking Champix, they do not feel the reinforcing and satisfying sensations normally associated with smoking.<sup>30</sup> Clinical trials indicate that people who used Champix for 12 weeks were 2.7 to 3.1 times more likely to quit smoking than those who received a placebo medication.<sup>31</sup>

results.<sup>27</sup> Side effects include dry mouth, headache, insomnia and, in rare cases, seizures.<sup>29</sup>

**The nicotine-free pill called Zyban must not be confused with the ZYBAN sold in nurseries, which is a fungicide powder used on grass and ornamental plants that is harmful to humans.**

The research literature suggests that two of the major barriers preventing smokers from using pharmacological medications are availability and cost.<sup>32-36</sup> Therefore, increasing the accessibility and decreasing the costs related to these pharmacological medications should result in higher usage rates.<sup>32</sup>

## 2. Behavioural and psychological interventions

Well-designed behaviour modification programs have been shown to double cessation rates.<sup>2</sup> Behavioural and psychological interventions most often are delivered in the form of counselling, although there are exceptions (e.g., an exercise program). Counselling typically includes developing coping skills, identifying and avoiding smoking triggers, developing relaxation techniques, nicotine fading (gradually reducing nicotine intake), and relapse prevention training.

### Counselling by a health-care professional

Studies have shown that cessation advice given by physicians, nurses, pharmacists, dentists, dental hygienists and therapists can help motivate smokers to quit and have a positive effect on cessation rates.<sup>37</sup> A review of studies found that a brief prompt with limited counselling can yield a quit rate of 3% to 13%, whereas a more intensive intervention that includes follow-up sessions can produce cessation rates between 13% and 40%.<sup>38-41</sup>

### Group and individual counselling

Both group and individual therapy increase the odds of quitting.<sup>4, 37-39</sup> Comparisons of group therapy and individual therapy suggest no differences in effectiveness; however, it has been suggested that although group therapy may be more cost-effective, more smokers may be willing to enter and persist in attending individual therapy. Group therapy has been found to be more effective than self-help or other less intensive interventions in helping people quit.<sup>42</sup> Many health agencies offer support and education through group programs at minimal or no cost to the smoker.

### Telephone quitlines

Telephone quitlines, especially “proactive” telephone quitlines, are effective in aiding tobacco cessation. Furthermore, they are growing in popularity because of their cost-effectiveness and high accessibility.

Telephone quitlines offer various services including counselling, educational materials, and referral to tobacco treatment programs.

Relapse can be an important opportunity for learning. What is viewed by some as failure can be a key part of the cessation process. If relapse is used constructively, it can become an effective tool, preparing the smoker for the next attempt. A smoker who has relapsed is in a good position to evaluate available cessation methods and decide what might work the next time. In fact, research suggests that smokers with a quitting history have a better chance of achieving abstinence in the next year or two.<sup>43</sup>



One advantage of telephone quitlines is that they are highly accessible to a substantial number of tobacco users. In fact, all Canadian provinces as well as the Yukon have toll-free quitlines, all of which are branches of a national quitline network.<sup>44</sup> Telephone quitlines are also a cost-effective way to deliver tobacco cessation treatment.<sup>4, 45</sup> Another advantage of telephone quitlines is the centralized nature of their operation, which makes it easier to manage and administer a quitline as a component of a larger tobacco control program.<sup>46</sup>

There are two types of approaches employed by telephone quitlines: a reactive approach, whereby assistance is provided only upon request of a client; and a proactive approach, whereby assistance is provided upon request of a client and, if agreed to by the client, further service is provided in the form of outbound calls made by a counsellor.<sup>46, 47</sup>

Both reactive and proactive telephone quitlines have been demonstrated as useful tools in tobacco cessation; however, more research has been conducted on proactive quitlines. Of the research that has been conducted, evidence shows that proactive quitlines are effective.<sup>1, 10-12, 48-50</sup> A meta-analysis of 13 studies showed that active quitlines yielded quit rates that were 56% higher than self-help quit rates.<sup>51</sup> Not only has it been demonstrated that telephone counselling independently increases the odds of quitting, but two recent studies indicated that telephone quitlines may enhance other treatment methods, such as use of smoking cessation medications and participation in counselling programs.<sup>52, 53</sup>

Proactive quitlines have received more widespread endorsement than reactive quitlines, including a recommendation in the *U.S. Clinical Public Health Clinical Practice Guideline and the Guide to Community Preventive Services* to use proactive quitlines as a way to help smokers quit.<sup>1, 46</sup> Research supports the use of reactive quitlines as well,<sup>11, 13</sup> and it is frequently recommended that they be accompanied by promotional campaigns.<sup>10, 54</sup>

Telephone quitlines are recommended to be part of a comprehensive tobacco control program. When developing and implementing a telephone quitline, it is important to consider the following:<sup>55</sup>

- the range of services offered
- staffing
- training and supervision
- evaluation
- promotion
- technology
- costs

### Online cessation

Large numbers of smokers can access the Internet to learn about quitting. However, finding an effective and reliable site can be a challenge. Advantages of online cessation websites include the relatively low costs

associated with the Internet, as well as the explosive growth of access to the Internet.<sup>56</sup> Approximately 675 million people worldwide use the Internet, and approximately 73% of Canadian adults and 81% of Albertan adults have access to the Internet.<sup>57</sup> This is advantageous because large numbers of smokers who want to quit may be able to find help online. Additionally, the research suggests that the perceived anonymity of the Internet provides a more comfortable setting (e.g., chat rooms, forums, listservs) for people to discuss health issues.<sup>58, 59</sup>

Although the Internet possesses the promising traits of low cost and high accessibility, the variability in quality of websites is a concern. There are hundreds of tobacco cessation websites, yet only a handful of these websites have been identified in the literature as useful in aiding tobacco cessation.<sup>56, 60, 61</sup> Although research in this area is nascent, emerging research suggests effective tobacco cessation websites are those that provide resources and advice tailored to individual smokers. It is also recommended that websites provide follow-up support.<sup>56, 61, 62</sup> Further evaluation of tobacco cessation websites is needed to identify effective websites and determine what makes these websites successful. Examples of tobacco cessation websites can be found in the “Further Resources” section of this handbook.

### Exercise

Smokers who are trying to quit are often concerned when they gain weight during a quit attempt.<sup>27</sup> Exercise is a healthy way to reduce weight gain, and there is speculation that it may have other benefits. The U.S. Department of Health and Human Services has identified this method as an area that merits further research.<sup>63</sup> Because the research is still in its early stages, strong conclusions cannot yet be made about the effect of exercise on tobacco cessation. Emerging research suggests that following a brief period of moderate-intensity exercise there is a short-term reduction in the symptoms of withdrawal and cravings.<sup>64, 65</sup> Moreover, cessation programs that incorporate exercise as part of treatment often show an improvement in cessation during treatment and shortly following treatment.<sup>66, 65</sup> However, research has not yet found a consistent relationship between long-term abstinence and exercise.<sup>68, 69</sup> The lack of findings may be due to inadequate research design; well-designed research studies will need to be conducted before reliable conclusions can be drawn about the effect of exercise on tobacco cessation.

### 3. Self-help

“Self-quitters” quit without the support of an organized program, although many use self-help aids that are designed to be used without additional assistance. Information and interactive tools are available to self-quitters, such as video or audiotapes, pamphlets or booklets, and computer programs. Research finds that self-quitters who use materials without intensive contact with a therapist often experience minimal

success in cessation.<sup>69</sup> Therefore, providing materials to smokers without counselling or therapy is of limited benefit; however, if the materials provided to the quitter are tailored to the individual smoker, as opposed to untailored or standard materials, then cessation rates minimally improve. Furthermore, research has shown that using self-help materials in conjunction with telephone quitlines can also increase the odds of successful cessation.<sup>69</sup>

Most smokers who try to quit “cold turkey” without any cessation aids meet with fairly low success.<sup>70</sup>

#### 4. Alternative therapies

Alternative, non-drug therapies are popular, although few have been scientifically proven to increase cessation rates. The following are some examples of non-drug therapies.

##### **Hypnosis**

Hypnotic therapy seeks to alter smokers’ attitudes about tobacco by offering them suggestions or prompts while they are in a relaxed and focused (hypnotic) state. Hypnosis can be used either in a group or an individual setting. The success rate of hypnosis is unclear.

##### **Acupuncture**

Acupuncture is based on the traditional medicine of affecting energy pathways in the body. Needles or staple-like attachments are inserted in the skin at strategic points with the theory that this will reduce or eliminate cravings to smoke.

In a recent review of several articles, the researchers concluded that acupuncture is ineffective in helping smokers quit. Although there is some promising research, not enough support has emerged to determine whether acupuncture is any more effective than placebo acupuncture (using sham acupuncture points) or no treatment in helping smokers quit.<sup>72, 73</sup>

##### **Laser therapy**

Laser therapy is based on the same principle as acupuncture, but it uses lasers rather than needles to relieve withdrawal symptoms. This method is new to Canada and there is no scientific evidence to support the high success rates attributed to it.<sup>72, 73</sup>

##### **Substitution**

Some smokers try to substitute herbal or clove cigarettes for their regular brands, believing them to be a healthy alternative. Insufficient literature exists about the health effects of herbal cigarettes. However, Health Canada has not deemed them as a safe alternative to smoking regular cigarettes, because of the danger associated with inhaling smoke of any kind.<sup>74</sup>

## Theories of Smoking Cessation

### The stages of change model

A popular approach used by health professionals and smokers to better understand the process of quitting is the stages of change model (the transtheoretical model of change). This model was developed 20 years ago, but has become widely used in cessation programs in the past few years. Today, many programs use a “staged” approach to intervention.<sup>75, 76</sup> The model recognizes that quitting does not happen in one step and that change is a dynamic process.

Understanding the stages of change model can help programmers refine their interventions and target smokers at various stages. Below is a description of the five stages involved in changing addictive behaviour and examples of appropriate intervention goals for each stage of change.<sup>75-78</sup>

#### 1. Precontemplation

In this first stage, the smoker has no intention of quitting in the next six months. Fifteen per cent of Canadian smokers are in this stage, according to the 2006 CTUMS.<sup>77</sup>

*Examples of appropriate intervention goals<sup>76</sup>*

- Increase the client's perception of the risks associated with smoking.
- Encourage the client to begin considering the pros and cons of smoking.

#### 2. Contemplation

A smoker in the contemplation stage is aware that a problem exists and is seriously thinking about quitting at some point, but has not yet made a plan to do so. People can remain in this stage for a long time. Seventeen per cent of Canadian smokers are in this stage.<sup>77</sup>

*Examples of appropriate intervention goals<sup>76</sup>*

- Tip the decisional balance in favour of quitting.
- Increase motivation to quit.

#### 3. Preparation

In this stage, the smoker has made a decision to quit within the next 30 days and prepares to do so. Usually this involves mental preparation, but some smokers also try to ready themselves for abstinence by cutting down or by delaying the first cigarette of the day. Eight per cent of Canadian smokers are in this stage.<sup>77</sup>



*Examples of appropriate intervention goals*<sup>76</sup>

- Help the client select the best approaches to cessation.
- Help build the client's confidence in his or her ability to achieve abstinence.

## 4. Action

The action stage begins with the first day of abstinence and continues for six months. Two per cent of Canadian smokers are in this stage.<sup>77</sup>

*Examples of appropriate intervention goals*<sup>76</sup>

- Help the client develop a plan of action (based on level of addiction and experience with previous cessation attempts).
- Support the client in learning cessation techniques and skills.

## 5. Maintenance

In maintenance, people actively work to prevent relapse and remain non-smokers. Maintenance is a continuation, not an absence, of change. More than half (57%) of Canadian former smokers (who quit smoking at least six months prior to the time of the survey) are in this stage.<sup>77</sup>

*Examples of appropriate intervention goals*<sup>76</sup>

- Help the client identify and use relapse prevention strategies (substitute behaviour, coping strategies).
- Offer support.

Research indicates that many smokers would like to quit: they are in the contemplation and preparation stages of change.<sup>77</sup> Many have already quit. As understanding of tobacco addiction and behaviour change continues to grow, the support for people wanting to quit will continue to evolve so that smokers have a better chance of overcoming their addiction.

**Self-efficacy theory**

Introduced by Bandura in 1977, self-efficacy theory contends that a person's perception of his or her ability to perform a task will affect the outcome.<sup>79</sup> In the research literature, self-efficacy typically emerges within the context of cessation maintenance. Particularly, research indicates that people with low levels of self-efficacy are more prone to relapse and those with high levels of self-efficacy are more likely to abstain.<sup>80-85</sup> As O'Leary (1992, p. 231) describes,

*A cigarette smoker who believes that he "just doesn't have what it takes" to quit is unlikely to attempt smoking cessation, or if he does, will not display much effort or persistence compared to someone with strong confidence in his or her self-regulatory capabilities*<sup>86</sup>

The relevance of the stages of change model to adolescent smoking cessation is currently being studied. Early findings suggest that the model is generally appropriate to youth, but likely requires some refinements because adolescents seem to enter the action stage prematurely. When young people do not complete the earlier stages, they are poorly prepared for cessation. Research suggests, therefore, that a heavy emphasis should be placed on the early stages of change (precontemplation and preparation) in youth cessation efforts.<sup>75</sup>

Researchers have also examined other factors that relate to self-efficacy theory and smoking cessation maintenance. For instance, researchers have found that high levels of negative affect (mood) and cigarette cravings were associated with decreased ability to abstain from smoking.<sup>87</sup> Self-efficacy has also been studied in relation to the stages of change model. Research finds that self-efficacy is associated with the transition between different stages.<sup>88-90</sup>

## Factors Affecting Smoking Cessation

Growing research on the physical aspects of addiction and the psychological aspects of behaviour change has helped to increase the smoker's chances of abstinence. The support offered to smokers today is based on an appreciation for the complexity of the cessation process, a process that is influenced by many interrelated factors, including<sup>91-93</sup>

- the degree to which the smoker is motivated to quit
- readiness to change and ability to change
- the extent of the smoker's biological and psychological addiction to nicotine
- the smoker's mood or mental state
- the smoker's level of confidence
- the smoker's past experience with cessation
- the smoker's environment (home, work and leisure)
- the influence of family and friends, and day-to-day events
- social support and information

Two factors, stress and weight control, have recently received attention in relation to smoking cessation.

### Stress

In Alberta, 26% of current smokers who had tried to quit smoking reported that the main reason they began to smoke again was stress or the need to relax or calm down.<sup>94</sup> In the literature, stress is identified as a significant barrier to smoking cessation. This may in large part be because smoking, for some people, is a mechanism for coping with stress.<sup>95, 96</sup> Research suggests that smoking behaviour may be initiated during adolescence in an attempt to cope with stressful life events; when asked to recall life events, smokers report more stressful life events than non-smokers.<sup>97-101</sup> Furthermore, smoking cessation has been associated negatively with stress and stressful life events.<sup>98, 102</sup> Stressful events such as bankruptcy, divorce and receiving welfare are related to heavier levels of smoking.<sup>103</sup> Financial stress and job loss have also been linked with a decreased likelihood to quit smoking.<sup>104, 105</sup>

In the 2006 Canadian Tobacco Use Monitoring Survey, Albertans who tried to quit but relapsed were asked "Why did you begin to smoke again?" The main reasons given were<sup>94</sup>

- stress, need to relax or to calm down (26%)
- addiction/habit (24%)

Other reasons given for resuming smoking, although mentioned rarely, included<sup>94</sup>

- family or friends smoke
- going out more
- boredom
- increased availability
- no reason/felt like it

Understanding the relationship between stress and smoking may help stakeholders develop more effective treatment programs. For instance, treatment programs may be more effective if they provide techniques for coping with stressful life events and focus on preventing smoking relapse in the face of such events. Similarly, health-care providers could ask former smokers about recent stressful episodes to provide appropriate aid and promote abstinence.<sup>98</sup>

### Weight control

Smokers who want to quit often report that they fear cessation will result in weight gain. This fear prevents smokers from quitting and often leads to relapse.<sup>107-115</sup> Weight gain is most frequently reported as a major concern for women, but it is also a concern for men.<sup>114,116,117</sup> The average amount of weight gained is about five to seven pounds. The health risks related to this weight gain are negligible as compared with the health risks of smoking.<sup>118</sup> Exercise during cessation may reduce or eliminate weight gain.<sup>69,119</sup>

### Youth smoking cessation

Many adolescents want to quit or reduce their smoking but frequently report difficulty in doing so.<sup>120-124</sup> This can be frustrating for youth who often indicate they are unable to refrain from smoking despite their best intentions.<sup>125,126</sup> Youth who try to quit may run into difficulties dealing with withdrawal symptoms.<sup>125,127</sup>

According to the 2006 CTUMS, 59% of Albertan youth (aged 15 to 19) and 44% of young adults (aged 20 to 24) reported that they were considering quitting within the 30 days following the survey. Smokers were also asked if they were seriously considering quitting smoking within the six months following the survey: 70% of Alberta youth (aged 15 to 19) and 70% of young adults (aged 20 to 24) who were smokers responded “Yes.”<sup>94</sup>

The majority of youth who smoke report that they would like to quit smoking and have made a serious attempt to do so.<sup>128</sup> However, youth who smoke may often think that quitting tobacco is not difficult enough to warrant intervention,<sup>129</sup> yet spontaneous quit rates are quite low.<sup>93</sup> Interestingly, the low spontaneous or unassisted quit rates among adolescents are sometimes unexpected because it is sometimes assumed that adolescents will “mature out” of smoking or easily quit on their own.<sup>120,125,130-133</sup>

It is apparent that young smokers need help quitting. Youth need access to and awareness of tobacco cessation programs, and these programs must be designed to appeal to youth and be relevant to them. Research supports the need to design smoking cessation aids that meet the specific needs of adolescent smokers.<sup>134</sup> For instance, cessation interventions that take place in a variety of settings can help address the diverse population of youth smokers.<sup>135</sup> Croghan et al. (2004) found that tobacco cessation

Smokers who are motivated to quit, who stay positive and who have positive support from those around them have a better chance of quitting.<sup>106</sup>

Studies have shown that long-term maintenance sessions can improve success rates.<sup>38</sup>

#### What helps youth to quit smoking

Youth with greater parental supervision have higher quit rates. Youth are motivated to quit by health concerns, appearance and cost.<sup>129,138-141</sup>

#### What keeps youth from quitting smoking

Youth say that it's more difficult to stop when peers smoke around them, offer them cigarettes, or harass them about not smoking.<sup>142</sup> They are also less likely to quit if their parents are smokers.<sup>131,143,144</sup>



To encourage young smokers to quit, it is useful to offer tobacco control programs that reach youth.

Programs currently offered in Alberta that are tailored to youth include "Kick the Nic," "BLAST," "Teaming Up for Tobacco-Free Kids," "ASTEP," "YAAP" and "Sport for Life."

messages designed by teens can encourage their peers to participate in cessation programs.<sup>136</sup> It has also been suggested that recruitment strategies be modified to attract youth who smoke to cessation programs.<sup>129</sup>

Established guidelines should be applied when developing youth smoking treatment programs. A valuable resource for such guidelines is the Youth Tobacco Cessation Collaborative (YTCC). YTCC is a collaborative effort between Canada and the United States that aims to increase knowledge of effective cessation, to raise awareness of and interest in youth cessation, and to create capacity to deliver effective cessation to youth. This group has prepared several useful documents on youth cessation, some of which cover guidelines and recommendations. Two such documents are *The Guide for Making Decisions in Youth Tobacco Cessation*<sup>129</sup> and the *National Blueprint for Action*.<sup>137</sup> These can be found on the website <http://www.youthtobacco cessation.org>

**For more detail on youth and smoking, refer to the Youth and Smoking chapter.**

## Tobacco cessation and co-addictions

***Smoking is highly associated with using other substances.***<sup>145-147</sup>

Smoking rates are higher among people who abuse alcohol than those who do not.<sup>148-151</sup> According to the 2005 Canadian Community Health Survey, in Canada, 86% of daily smokers, 91% of occasional smokers and 75% of non-smokers had consumed alcohol within the year prior to the survey. Similar results were found for Alberta: 88% of daily smokers, 82% of occasional smokers and 74% of non-smokers had consumed alcohol within the year before the survey.<sup>152</sup> The 2006 CTUMS indicated that 34% of current smokers in Canada had used marijuana within the year before the survey, versus 21% of never smokers and 15% of former smokers. For Alberta, 33% of current smokers and 18% of never smokers reported using marijuana within the year before the survey.<sup>94</sup>

***People who smoke and use other substances find it more difficult to quit smoking.***

Research shows that smokers who use alcohol or illicit drugs find it more difficult to quit smoking than do people who smoke but do not use alcohol or illicit drugs.<sup>145-147, 153</sup> This greater difficulty may be due in part to higher nicotine dependence in smokers who use other substances.<sup>154, 155</sup> Considering this and the high rates of smoking among users of other substances, treatment of dependence on smoking and dependence on other substances has been an emerging issue in the treatment area.

In the past, it was assumed that people who smoke and use other substances would not want to try to quit smoking while stopping substance use, for fear that the attempt to quit would compromise their ability to remain sober. It has been suggested in the research, for example, that many



people with alcohol problems use cigarettes to cope with urges to use alcohol and other drugs. It was also believed that patients feared that trying to quit smoking may divert energy and focus from attempts to stop other substance use.<sup>156, 157</sup> Recently, however, several studies offer evidence that some people are interested in quitting smoking during or after treatment for their dependency on alcohol or other drugs.<sup>16-20, 146, 148, 150, 158-160</sup>

***Quitting smoking during a cessation attempt for another substance does not jeopardize sobriety from the other substance. In fact, simultaneous cessation can be beneficial, so long as concurrent treatment is not mandatory.***

Simultaneous cessation treatment for tobacco and other substances has been examined in the literature. Several studies conclude that alcohol abstinence is not jeopardized by concurrent smoking cessation.<sup>161-163</sup> Moreover, studies have indicated that quitting smoking can improve sobriety from other substances.<sup>147, 163-165</sup> However, mandatory cessation programs have had unintended negative effects (iatrogenic effects) on abstinence outcomes. This finding emphasizes that it is important that the individual is receptive to concurrent treatment.<sup>159, 160, 164</sup>

One study showed that those who use both smokeless tobacco and cigarettes were less likely to stop using tobacco than users of just cigarettes or just smokeless tobacco.<sup>166</sup>

## Tobacco cessation among people with mental health problems

Smoking rates are high among those with mental health problems,<sup>167-170</sup> and tobacco use has a severe impact on the health and finances of this population,<sup>171-173</sup> a group that is already at higher risk for morbidity and premature death.<sup>169, 174, 175</sup> Yet, people with mental health problems who want to quit smoking may not receive the support they need.<sup>176-180</sup>

There are some extra factors to consider when helping people with mental health problems to stop using tobacco. A literature review by Brown (2004) suggests that tobacco cessation may increase the risk of psychiatric complications for a person with mental health problems. When pharmacological cessation aids are used, possible side-effects should be considered. Moreover, it is important to be aware that smoking tobacco can interact with medications: medical staff will need to monitor patients who are trying to quit for changes that result from the absence of tobacco and its interactions with medication.<sup>181, 182</sup>

There is insufficient Canadian research about the efficacy of the various treatment methods available for people with mental health problems. Existing international research suggests that methods commonly used for smokers can also be effective in this population. The following

measures are recommended for smokers with mental health problems who are trying to quit.<sup>183</sup>

- A multiple treatment approach should be adopted. This includes brief advice from health professionals,<sup>184</sup> pharmacological treatment, and expert cessation support.<sup>169</sup>
- Treatment should not occur when the mental illness is highly active, but rather when the patient is stable.<sup>185</sup>
- People with mental health problems should be followed closely to monitor their mental health status.<sup>169</sup>

In addition to the various treatments, smoke-free policies can be implemented in mental health institutions to encourage smoking cessation. Supportive participation and careful planning by hospital staff may alleviate many of the anticipated adverse effects of a smoke-free policy.<sup>186</sup> Though smoke-free policies can be implemented successfully, such policies should be accompanied by smoking cessation treatment to improve smoking cessation rates.<sup>187</sup>

## Smokeless Tobacco Cessation

### ***Incorporating oral assessments and behavioural interventions in dental practices may increase smokeless tobacco cessation rates.***<sup>14</sup>

Dentists and dental hygienists are trained to detect oral lesions and periodontal problems that are related to tobacco use. Dentists and dental hygienists are thus in a position to help prevent the initiation of tobacco use by children and adolescents through the use of positive anti-tobacco messages. Over the past decade, tobacco cessation strategies have been modified for practical use in the dental setting.

One study reviewed several brief smokeless tobacco cessation treatment interventions by dental professionals: oral cancer screening, cessation advice, self-help materials, and brief cessation counselling by a dental hygienist. The study showed that oral screening and brief cessation counselling by dental professionals in the dental office or in athletic facilities were effective in promoting smokeless tobacco cessation.<sup>188</sup> Furthermore, a 2006 review showed that behavioural interventions by oral health professionals improved smokeless tobacco cessation rates. Incorporating oral assessments and behavioural interventions in dental practices may increase smokeless tobacco cessation rates.<sup>14</sup>

A U.S. study revealed that mental health patients preferred using a nicotine inhaler to wearing a nicotine transdermal patch.<sup>191</sup>

Behavioural interventions beyond the dental setting (e.g., doctor examinations) are also effective in helping smokeless tobacco users quit. Specifically, interventions that entail an oral examination as well as feedback about mucosal changes brought on by smokeless tobacco use (e.g., oral cancer, leukoplakia, stomatitis, keratosis, hairy tongue) have been shown to be effective.<sup>189</sup>

In a 2004 review of studies examining smokeless tobacco cessation, there was no indication of benefits of using pharmacotherapy such as bupropion, a nicotine patch, or nicotine gum. However, it was suggested that larger trials investigating pharmacotherapy are needed. Research in the area of smokeless tobacco cessation is limited, but seems to suggest that a combination of therapies offers the greatest possibility for success.<sup>190</sup>

## For the Smoker: Benefits of Cessation

There are many benefits to quitting smoking.<sup>117</sup>

- improved health
- greater sense of physical well-being
- better sense of smell and taste
- healthier babies
- cleaner-smelling home, person and car
- good example for children
- no worry about exposing others to second-hand smoke
- money savings
- less perceived stress
- improved self-esteem
- freedom from addiction

Smokers who relapse after having quit for a week or more should be strongly encouraged to avoid returning to high levels of cigarette consumption. By reducing their addiction level, they will better their chances of cessation the next time around.<sup>192</sup>

### *After the last cigarette, the body begins healing itself:*

- 20 minutes after quitting, blood pressure drops to pre-cigarette level.
- 8 hours after quitting, the carbon monoxide in a smoker's blood returns to normal.
- 24 hours after quitting, smokers lower their chances of having a heart attack.

### *In the months and years to come, the body will continue to recover:*

- Two weeks to three months after quitting, circulation will improve and lung function will increase (try taking the stairs now).
- Within nine months of quitting, smokers will experience less coughing, sinus congestion, fatigue and shortness of breath.
- One year after quitting, risk of coronary heart disease will be about half of what it would have been if the smoking behaviour continued.
- Five years after quitting, the risk of stroke will be substantially reduced: within five to 15 years after quitting, it becomes about the same as a non-smoker's.
- Ten years after quitting, the risk of dying from lung cancer will be about half of what it would have been had the smoking behaviour continued. The risk of cancer of the mouth, throat, esophagus, bladder, kidney and pancreas will also decrease.
- Fifteen years after quitting, the risk of coronary heart disease will be the same as a non-smoker's.

Although quitting smoking is followed by a multitude of beneficial outcomes, there are some withdrawal symptoms, which typically include<sup>117</sup>

- irritability
- anxiety
- difficulty concentrating
- restlessness
- sleeplessness
- depression
- increased appetite
- cravings

With motivation and help, smokers can assuage these withdrawal experiences and improve their chances of quitting.



## Summary

The U.S. Public Health Service (PHS) Clinical Practice Guideline was developed in 2000 for health professionals. This guide contains the best evidence-based information about treatment effectiveness. The overall PHS model for treatment of tobacco addiction includes reaching smokers within a larger population unit through various channels or delivery systems within the community, and screening smokers and encouraging them at every opportunity to consider cessation. Once smokers are screened, health professionals can employ the 5 A's intervention strategy suggested in the PHS guideline.

A wide range of cessation methods are available in Alberta to help smokers cope with the physical and psychological symptoms of withdrawal, and to support the process of long-term change. Drug therapy, counselling and telephone quitlines are a few of the methods that have proven effective.

Incorporating oral assessments and behavioural interventions in dental practices may increase smokeless tobacco cessation rates.

Many youth want to quit but need help to do so. Cessation programs for youth need to be evaluated and developed in order to provide the most effective type of programming for youth who want to quit smoking. There are established guidelines that are useful for developing youth smoking treatment programs.

Substance use and smoking co-occur at high rates. Quitting smoking during a cessation attempt for another substance does not jeopardize sobriety from other substances and can be beneficial.

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## FURTHER RESOURCES

### International Tobacco Reduction Websites

#### American Legacy Foundation: Quit Smoking

<http://www.americanlegacy.org>

An independent public health foundation located in Washington, D.C., American Legacy develops programs that address the health effects of tobacco use by means of grants, training, youth activism, strategic partnerships, marketing, public relations and community outreach. The site offers information on the American Legacy Foundation's programs, partners, tobacco research and publications, involvement with the media, and other resources. There is also a "Quit Smoking" section that provides online resources, tips, toolkits and research findings regarding cessation.

#### American Lung Association

<http://www.lungusa.org>

The American Lung Association fights lung disease in all its forms, with special emphasis on asthma, tobacco control and environmental health. This website can be used to obtain information on tobacco control and smoking cessation. The Freedom From Smoking program can also be accessed from this site.

#### Centers for Disease Control and Prevention: Smoking and Tobacco Use

<http://www.cdc.gov/health/tobacco.htm>

The Centers for Disease Control and Prevention is an internationally recognized organization providing credible, evidence-based information on a variety of health topics, including tobacco issues. From this website, visitors can find scientific publications such as the U. S. surgeon general's reports and the Morbidity and Mortality Weekly Report, tobacco control program guidelines and best practices, education materials, information on adolescent tobacco use, and resources to help people quit smoking.

#### GLOBALink

<http://www.globalink.org>

GLOBALink receives funding from the European Commission and is managed by the International Union Against Cancer. This site is an international tobacco control network serving all those active in tobacco control and public health. It contains an array of tobacco-related topics, presented and discussed in an online community. An online tobacco encyclopedia, TobaccoPedia (<http://www.tobaccopedia.org>), is also accessible through this website.

**National Cancer Institute: Publications List**

<https://cissecure.nci.nih.gov/ncipubs/>

This website provides valuable cancer-related health information and reports on the work conducted by NCI-supported scientists throughout the United States. For the general public and health professionals, NCI offers consumer-oriented information on a wide range of topics as well as comprehensive descriptions of research programs.

**National Institute for Drug Administration (NIDA): Smoking**

<http://smoking.drugabuse.gov>

NIDA supports a significant portion of the world's research on the health aspects of drug abuse and addiction. This website describes nicotine and the dangers of tobacco use. The site contains useful fact sheets on cigarettes and other nicotine products, research, and evidence-based publications on nicotine and tobacco.

**Partners with Tobacco Use Research Centers**

<http://www.tturcpartners.com>

Funded by the Robert Wood Johnson Foundation, Partners is an effort to study new ways of combatting tobacco use and nicotine addiction. This site helps to translate the results and implications of this work for policy makers, practitioners and the public.

**Robert Wood Johnson Foundation (RWJF)**

<http://www.rwjf.org/portfolios/interestarea.jsp?iaid=143>

The RWJF is a major sponsor and funding body for tobacco-related research in the United States and internationally. Tobacco-related information regarding funding opportunities, grant application guidelines, research and publications can be found on this site.

**Society for Research on Nicotine and Tobacco (SRNT)**

<http://www.srnt.org>

The mission of SRNT is to stimulate the generation of new knowledge concerning nicotine in all its manifestations, from molecular to societal. This site offers information on conferences, membership, publications and research as they relate to nicotine and tobacco.

**Tobacco Control Supersite**

<http://tobacco.health.usyd.edu.au>

Developed by the University of Sydney, Australia, the Tobacco Control Supersite is primarily used to make available previously private tobacco industry documents. The site also provides links for public health researchers and advocates in addressing contemporary issues in international tobacco control.

### **Tobacco Technical Assistance Consortium (TTAC)**

<http://www.ttac.org>

Supported by Emory University and Rollins School of Public Health, TTAC is an independent, nonprofit organization dedicated to assisting organizations in building and growing highly effective tobacco control programs. The site offers access to tobacco workshops, surveys, reports, projects and contacts to provide technical assistance for those involved with the promotion of tobacco control programs.

### **University of California, San Francisco (UCSF) Center for Tobacco Control Research and Education**

<http://tobacco.ucsf.edu>

The World Health Organization supports the UCSF Center for Tobacco Control Research and Education. The center's work is designed to inform and improve the effectiveness of public health and clinical interventions to reduce tobacco use, and involves policy and historical research, economics and science. This site provides information on this work as well as tobacco documents, publications, scholarships and smoking cessation guides.

### **United Kingdom Department of Health: Tobacco**

<http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/Tobacco/fs/en>

The Department of Health's mission is to improve the health and well-being of people in England. This link has useful information on the United Kingdom's tobacco policy, key tobacco documents, events, smoking cessation, tobacco advertising and resources.

### **World Bank Group**

<http://www.worldbank.org/tobacco/reports.htm>

Sponsored by the United Nations and various international governments, the World Bank aims to improve the living standards of people. As part of this goal, the World Bank Group's website contains tobacco- and nicotine-related reports, tobacco myths and facts, reduction strategies and other tobacco resources.

### **World Health Organization (WHO): Tobacco Free Initiative (TFI)**

<http://www.who.int/tobacco/en/>

TFI is a WHO project created to focus international attention, resources and action on the global tobacco pandemic that kills five million people a year. TFI's objective is to reduce the global burden of disease and death caused by tobacco. The TFI website provides information on tobacco research, surveillance, communications and publications. TFI also facilitates a global network to reduce harm caused by tobacco.



## **World No Tobacco Day (WNTD)**

<http://www.wntd.org>

WHO annually sponsors World No Tobacco Day to call attention to the seriousness of the impact of tobacco on health. This site offers useful information for people and organizations that would like to get involved with WNTD.

## **National Tobacco Reduction Websites**

### **Canadian Cancer Society (CCS)**

<http://www.cancer.ca>

The CCS is a community-based organization of volunteers whose mission is the eradication of cancer and the enhancement of the quality of life of people living with cancer. This site provides tobacco information and resources as they relate to cancer. The site also has links to provincial issues related to cancer and tobacco.

### **Canadian Council for Tobacco Control (CCTC)**

<http://www.cctc.ca>

The CCTC is committed to ensuring the timely and practical transfer of critical knowledge and skill development for effective local, provincial and national action on tobacco issues. The CCTC acts as a key facilitating agent to co-ordinate and support advocates in tobacco control. It does this by creating and maintaining a knowledge network and actively linking key people and agencies throughout the tobacco control movement so that they may benefit from each other's knowledge and experience.

### **Canadian Lung Association**

<http://www.lung.ca>

This Canadian Lung Association is focused on treatments and cures for cancer. This site provides Canadian statistics on smoking and its consequences, cessation guides (see below), links to tobacco information regarding children, and a description of diseases related to smoking. The site also links to the provincial lung associations.

To access the downloadable cessation workbook entitled Do You Want To Quit? use the following link: [http://www.lung.ca/smoking/smoking\\_cessation.pdf](http://www.lung.ca/smoking/smoking_cessation.pdf)

### **Canadian Tobacco Control Research Initiative (CTCRI)**

<http://www.ctcri.ca>

The CTCRI is a collaboration of national health and research organizations working to increase capacity and innovation in research relevant to tobacco control policy and programs. The site provides information on their partnerships, tobacco research funding and related publications, and projects.

## Health Canada Tobacco Control Programme

<http://www.gosmokefree.ca>

As part of the Federal Tobacco Control Strategy, the primary mission of the Tobacco Control Programme is to reduce death and disease caused by tobacco. To help achieve this goal, the Go Smoke Free! website provides comprehensive tobacco information on research, policy, legislation, youth and quitting. This site also offers facts about tobacco including health effects, second-hand smoke, trends, the tobacco industry, and resources for professionals.

## Heart and Stroke Foundation

<http://www2.heartandstroke.ca>

The Heart and Stroke Foundation is a voluntary non-profit organization whose mission is to improve the health of Canadians by reducing disability and death caused by heart disease and stroke. This site can be searched for tobacco and smoking topics including smoking cessation tips, bylaws related to smoking, risks, health effects, and international news on tobacco. The site also provides provincial links that offer local information on the Heart and Stroke Foundation.

## Non-Smokers' Rights Association

<http://www.nsra-adnf.ca>

The Non-Smokers' Rights Association is a non-profit health organization involved with national and global tobacco control efforts. This site provides useful tobacco- and smoking-related information regarding news, taxes and smuggling, the industry, second-hand smoke, youth and the media, international issues, and research.

## Physicians for a Smoke-Free Canada

<http://www.smoke-free.ca>

Physicians for a Smoke-Free Canada is a health organization of Canadian physicians who share one goal: the reduction of tobacco-caused illness through reduced smoking and reduced exposure to second-hand smoke. On this site, visitors can find out more about tobacco research, publications, health information, public issues, and the tobacco industry.

## Provincial Tobacco Reduction Websites

### Alberta Alcohol and Drug Abuse Commission (AADAC)

<http://www.aadac.com>

Funded by the Alberta Government, AADAC sets out to assist Albertans in achieving freedom from the harmful effects of alcohol, other drugs and gambling. AADAC's website, [aadac.com](http://aadac.com), provides information on tobacco, smoking, youth prevention, and how to quit. The site also offers information about the Alberta Tobacco Reduction Strategy, programs, resources, media campaigns and municipal bylaws, and offers interactive games.

### **British Columbia Ministry of Health: Tobacco Control Program**

<http://www.healthplanning.gov.bc.ca/tobacco/index.html> Sponsored by the B.C. Ministry of Health, the British Columbia Tobacco Control Program's objectives are to prevent youth and young adults from starting to use tobacco, and to encourage and assist tobacco users to quit or reduce their use of tobacco products. This website describes the B.C. Tobacco Control Strategy, and provides information on tobacco laws, cessation, protection from second-hand smoke, research and surveillance.

### **British Columbia Ministry of Health: Tobacco Facts**

<http://www.tobaccofacts.org>

As part of the B.C. Ministry of Health's Tobacco Control Program, tobaccofacts.org has a mandate to protect British Columbians, especially youth, from the harmful effects of tobacco. This website provides tobacco prevention resources for kids, teachers and parents. There are also resources for smokers who want to quit.

### **Manitoba Department of Health: Healthy Living Manitoba**

<http://www.gov.mb.ca/healthyliving/smoking.html>

Funded by the Government of Manitoba, Health Living Manitoba is committed to reducing tobacco use by means of policy, research, education, industry accountability, and supporting capacity for action. This site provides information on the Manitoba Tobacco Reduction Strategy, facts, links for kids, and information on various tobacco reduction activities and resources in Manitoba.

### **Government of the Northwest Territories Health and Social Services**

<http://www.hlthss.gov.nt.ca/Features/Initiatives/default.asp>

Building on national and territorial strategies prepared over the past four years, Action on Tobacco: A Territorial Strategy for Tobacco Control identifies the goals, actions and measures to prevent or reduce the use of tobacco in the N.W.T. This site provides a link to the Action on Tobacco initiative.

### **New Brunswick Anti-Tobacco Coalition**

<http://www.nbatc.ca>

Sponsored by the Provincial Ministers of Health and Health Canada, the New Brunswick Anti-Tobacco Coalition aims to change attitudes and behaviour toward tobacco products and tobacco use to build support for anti-tobacco measures. The site has information on projects and events, and provides reports and links to other tobacco-related resources.

### **Newfoundland and Labrador Alliance for the Control of Tobacco**

<http://www.actnl.com>

Funded by Newfoundland's Department of Health and Community Services, this organization's mandate is to implement a provincial tobacco reduction strategy. The site offers information on the reduction strategy, tobacco-related campaigns, and the partners involved with implementing the strategy.

### **Nova Scotia Department of Health: Tobacco Control Unit**

<http://www.gov.ns.ca/ohp/tcu/>

The province of Nova Scotia's Tobacco Control Unit website provides a wide range of information, from helpful tips on quitting tobacco use to statistics on smoking-related illness.

### **Ontario Campaign for Addiction on Tobacco (OCAT)**

<http://www.ocat.org>

Funded by provincial and national health agencies, OCAT is largely devoted to second-hand smoke issues. This site focuses on health effects, ventilation, legislation and law, economic impacts, and advocacy.

### **Cancer Care Ontario**

[http://www.cancercare.on.ca/index\\_tobacco.htm](http://www.cancercare.on.ca/index_tobacco.htm)

Cancer Care Ontario is a planning and research organization that advises the Ontario government on all aspects of provincial cancer care, provides information to health-care providers and decision makers, and motivates better cancer system performance. The site offers cancer- and tobacco-related information on health practice guidelines, research, services, screening, prevention and planning.

### **Ontario Tobacco-Free Network (OTN)**

<http://www.theotn.org>

The Ontario Ministry of Health and Long-Term Care sponsors OTN, which supports a network of local tobacco-free councils co-ordinated by public health staff and community volunteers throughout Ontario. The site focuses on promotion of the Ontario Tobacco Strategy and connects various organizations that hold similar interests in reducing the harm caused by tobacco.

### **Ontario Tobacco Research Unit (OTRU)**

<http://www.otru.org>

The Department of Public Health Sciences at the University of Toronto sponsors OTRU, whose mandate is to foster and conduct research as well as monitor and evaluate programs and policies in order to eliminate tobacco-related health problems in Ontario. Information on this site includes research, research networks, training and teaching, and publications.



### **Program Training and Consultation Centre (PTCC)**

<http://www.ptcc-cfc.on.ca>

The Ontario Ministry of Health and Long-Term Care funds PTCC, which provides training, consultation, network opportunities and referral sources related to Ontario health promoters. Workshops, consultation, resources and better practice toolkits can be accessed from this site.

### **Saskatchewan Coalition for Tobacco Reduction**

<http://www.sctr.sk.ca>

The Saskatchewan Coalition for Tobacco Reduction's mission is to advocate, co-ordinate, and educate the public to ensure a tobacco-free Saskatchewan for all its residents. The website includes links to activities, events and members. There is also information on prevention, quitting and smoke-free legislation.

### **Saskatchewan Health: Tobacco Reduction**

[http://www.health.gov.sk.ca/ps\\_tobacco\\_reduction.html](http://www.health.gov.sk.ca/ps_tobacco_reduction.html)

Saskatchewan Health ensures co-ordination of tobacco policy across sectors and leads the implementation of organizational policies and legislation that support tobacco reduction. The department also makes available information about tobacco use prevention, cessation, protection and denormalization. This website provides information on the province's Tobacco Control Act, and tobacco legislation and policy.

### **Saskatchewan Health: Smokeless Tobacco**

[http://www.health.gov.sk.ca/rr\\_smokeless\\_tobacco.html](http://www.health.gov.sk.ca/rr_smokeless_tobacco.html)

This Government of Saskatchewan website provides facts about smokeless tobacco. The site includes information on methods of consumption, ingredients in smokeless tobacco, comparisons with smoked tobacco, health effects, and tips for quitting smokeless tobacco.

### **Yukon Health and Social Services: smokersline.ca**

<http://www.smokersline.ca>

Yukon Health and Social Services provides this website on tobacco, which has information on the Yukon Tobacco Reduction Strategy, tobacco facts, games and stories, and information for smokers who want to quit.

## **Specific Topic Areas**

### **Cessation**

#### **Aboriginal Youth Network: A Tribe Called Quit**

<http://www.ayn.ca/quit/en/home.asp>

Funded by Health Canada, the Aboriginal Youth Network presents the Tribe Called Quit website. Intended for non-smokers, smokers and ex-smokers, this site provides facts and information for Aboriginal youth on quitting, tobacco use and the tobacco industry.

### **Agency for Healthcare Research and Quality (AHRQ)**

<http://www.ahrq.gov/consumer/index.html#smoking>

The U.S. Department of Health and Human Services sponsors AHRQ, which strives to advance excellence in health care. This link offers various smoking cessation tips including the You Can Quit Smoking kit, a one-stop information source to help smokers become tobacco-free.

### **Health Canada Tobacco Control Programme: Quit Smoking**

[http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/quit-cesser/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/quit-cesser/index_e.html)

This Government of Canada sponsored site offers a variety of resources on quitting, including credible information on different nicotine replacement therapies and alternatives to assist in smoking cessation. Additionally, the site has quit-smoking program tips and information targeting specific audiences.

### **North American Quitline Consortium (NAQC)**

<http://www.naquitline.org>

Supported by the American Legacy Foundation, NAQC seeks to unite health departments, quitline service providers, researchers and national organizations in the United States and Canada to enable these quitline professionals to learn from each other and to improve quitline services for tobacco cessation. The NAQC website aims to improve the efficacy of telephone quitlines by providing quitline contacts, resources, research and current news.

### **Professional Assisted Cessation Therapy (PACT)**

<http://www.endsmoking.org>

PACT is an independent consortium of leaders in the treatment of tobacco dependence whose mission is to lower barriers in order to broaden use of cessation therapy through education and advocacy. This U.S.-based organization's website includes information about membership, tobacco news, cessation resources and programs.

### **QuitNet: A Free Resource to Quit Smoking**

<http://www.quitnet.com>

QuitNet operates in association with the Boston University School of Public Health. Led by the principle of "smokers helping smokers to quit," QuitNet creates tailored smoking cessation for public and private organizations. The website offers a variety of useful ways to help smokers quit, including smoking cessation resources, tips and advice, an online community, and a package to create individual cessation plans.

An Alberta-specific QuitNet website is available at <http://www.albertaquits.ca>

### **Smokefree.gov**

<http://www.smokefree.gov>

Smokefree.gov is a website sponsored by the U.S. government and created by the Tobacco Control Research Branch of the National Cancer Institute. Smokefree.gov aims to help smokers quit by providing tools and information including an online step-by-step cessation guide, quitlines, publications and quitting advice.

### **Stop Smoking Center (SSC)**

<http://www.stopsmokingcenter.net>

This website and support community can help those who have recently quit, or those who are thinking about quitting smoking. People can talk to experienced quitters in an expert moderated support group, find a “quitting buddy” or create their own free customized quit program that will track their progress and help them when they need it most.

### **Tobacco Free Nurses**

[www.tobaccofreenurses.org](http://www.tobaccofreenurses.org)

Funded by The Robert Wood Johnson Foundation in partnership with various nursing associations, Tobacco Free Nurses sets out to help smoking nurses and nursing students quit tobacco. This U.S. site provides information on smoking cessation, research, international links, and quitting strategies for nurses.

### **Treatobacco.net**

<http://www.treatobacco.net>

This site is primarily produced and maintained by the Society for Research on Nicotine and Tobacco. It is a resource for those working on the treatment of tobacco dependence throughout the world. It offers evidence-based information on treatment of tobacco dependence with regard to efficacy, safety, demographics and health effects, health economics, and policy.

## **Youth and smoking**

### **A Breath of Fresh Air**

<http://www.4woman.gov/quitsmoking/teens>

The National Women’s Health Information Center is a U.S. government-sponsored website dedicated to helping young women cease smoking by addressing why it is important to quit and how to quit. This site is for both teens and parents, and has information about cigarettes, publications, fast facts and cessation resources.

### **Campaign for Tobacco-Free Kids**

<http://www.tobaccofreekids.org>

The Robert Wood Johnson Foundation, the American Cancer Society and the American Heart Association fund the Campaign for Tobacco-Free Kids. The campaign's objective is to free America's youth from tobacco and to create a healthier environment. This U.S. website exposes the tactics used by the tobacco industry to hook youth into tobacco consumption. The site includes resources such as global initiatives, research and facts, youth action, a tobacco ad gallery and current news.

### **Centers for Disease Control and Prevention: Youth Tobacco Prevention**

<http://www.cdc.gov/tobacco/youth/index.htm>

The U.S. Office of Smoking and Health (OSH), a branch of CDC, is the primary sponsor of this website. OSH is responsible for leading and co-ordinating strategic efforts aimed at preventing tobacco use among youth, promoting smoking cessation among youth and adults, protecting non-smokers from second-hand smoke and eliminating tobacco-related health disparities. The TIPS website has many helpful tips, research, data, reports, educational materials, campaigns and other links to useful information regarding tobacco and tobacco cessation. There is also a how-to-quit resource for youth, entitled I Quit, which can be found at [http://www.cdc.gov/tobacco/quit\\_smoking/how\\_to\\_quit/iquit](http://www.cdc.gov/tobacco/quit_smoking/how_to_quit/iquit)

### **Health Canada: Youth Zone**

[http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/youth-jeunes/index\\_e.html](http://www.hc-sc.gc.ca/hl-vs/tobac-tabac/youth-jeunes/index_e.html)

This Health Canada website is aimed at raising youth awareness about the tobacco industry, the harmful effects of tobacco, and the importance to quit or refrain from tobacco use. The site includes guides and tips for quitting, online handbooks, information on the tobacco industry, and useful links.

### **NoTobacco.org**

<http://www.notobacco.org>

Sponsored by the Foundation For a Smokefree America, NoTobacco.org has a mission to motivate youth to stay tobacco-free and to empower smokers to quit. This U.S. website contains multimedia information and links to resources about tobacco use, reading material for youth and adults, and quitting tips for youth.

### **Quit4Life**

<http://www.quit4life.com>

This Health Canada website provides information and resources to help youth quit smoking. Quit for Life is designed to help daily and occasional smokers aged 12 to 18 to quit smoking. This program builds on confidence and motivation to quit, provides youth with information about the roadblocks to quitting and how to deal with stress, and provides a process for quitting using a four-step plan.



## Smoke Free Homes and Cars Program

<http://www.epa.gov/smokefree>

From the U.S. Environmental Protection Agency, Smoke Free Homes and Cars is an information resource for both parents and children who want to find out more about protecting children from second-hand smoke. The site includes success stories, information on how second-hand smoke can harm children, and guides to keeping children's environments free from second-hand smoke.

## Smokeless tobacco

### American Academy of Family Physicians

<http://www.familydoctor.org/handouts/177.html>

This website operated by the American Academy of Family Physicians is meant as an educational health resource. The smokeless tobacco section offers thorough guidance for those who want to quit using spit tobacco.

### American Academy of Otolaryngology: Spit Tobacco

[http://www.entnet.org/healthinfo/tobacco/spit\\_tobacco.cfm](http://www.entnet.org/healthinfo/tobacco/spit_tobacco.cfm)

This brochure on smokeless tobacco from the American Academy of Otolaryngology highlights the dangers of using spit tobacco and provides cessation tips. Spit tobacco definitions, ingredients, health effects, and warning signs of harmful use are accessible via this site.

### National Spit Tobacco Educational Program (NSTEP)

<http://www.nstep.org>

Sponsored by Oral Health America and funded in part by the Robert Wood Johnson Foundation, NSTEP is an effort to educate the family and the American public about the dangers of smokeless tobacco, and break the long-standing link between this potentially deadly drug and its use at sporting events. This Michigan-based website provides facts and resource materials to educate the public on the dangers of spit tobacco.

For a useful step-by-step guide to quitting smokeless tobacco use, see <http://www.nstep.org/QuittingSpitTobacco.htm>

## Pregnancy and smoking

### National Partnership to Help Pregnant Smokers Quit

<http://www.helppregnant smokersquit.org>

This U.S.-based website is the result of a coalition of diverse organizations joining forces to help pregnant smokers quit. Online resources include research articles and statistics on pregnant smokers, relevant policy and legislation, an outline of employee benefits and how they apply when quitting, information on finding and using services offered by care professionals, and numerous toolkits.

### Pregnant Risk Assessment Monitoring System (PRAMS)

<http://www.cdc.gov/PRAMS/index.htm>

PRAMS is a surveillance project of the Centers for Disease Control and Prevention, and U.S. state health departments. PRAMS collects state-specific, population-based data on maternal attitudes and experiences before, during and shortly after pregnancy. The site offers background information on PRAMS, details on the research and results, and available data from PRAMS.

### Pregnets

<http://pregnets.org>

Pregnets' mission is to decrease the negative consequences of smoking and environmental tobacco smoke on the woman, fetus and child by encouraging health-care providers to include minimal contact interventions into routine assessments and health care. This site hosts the most up-to-date information on smoking cessation practices for pregnant and postpartum women. The site also has answers to common questions about pregnancy and smoking, second-hand smoke, and getting help and support for quitting smoking.

### Smoke-Free Families

<http://www.smokefreefamilies.org>

A U.S. program supported by the Robert Wood Johnson Foundation, Smoke-Free Families is working to discover the best ways to help pregnant smokers quit, and to spread the word about effective evidence-based treatments. The site contains tobacco information on how to quit, current research, care professionals, grants, help for pregnant smokers, and general information about the program.

## Proprietary and Creative

The first principle in the theory of the firm is that the firm is a collection of individuals who are bound together by a set of shared goals and values. This is the foundation of the firm's identity and its ability to create a unique competitive advantage. The second principle is that the firm is a collection of individuals who are bound together by a set of shared goals and values. This is the foundation of the firm's identity and its ability to create a unique competitive advantage.

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